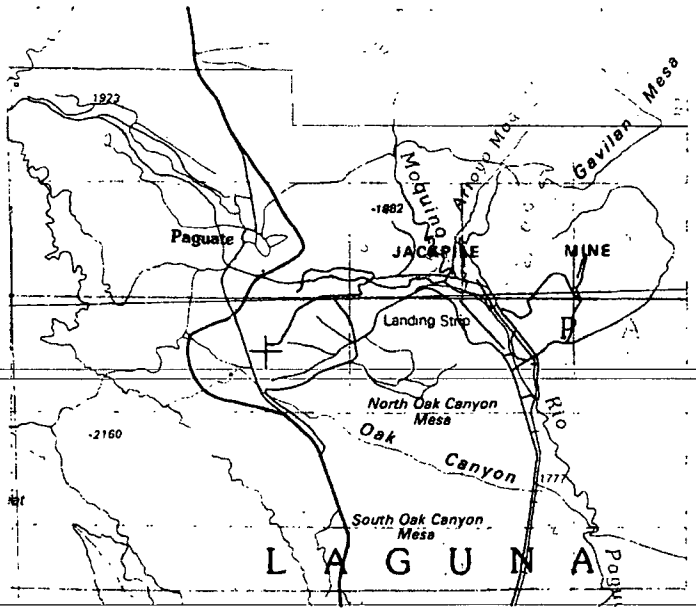
REDACTED VERSION

Pueblo of Laguna
P.O. Box 194
Laguna, New Mexico 87026

Confidential Claim Retracted
AUTHORIZED BY: SL
DATE: 5/16/13

Jackpile Reclamation Project
Pueblo of Laguna, New Mexico



Project Status Report No. 12
July, 1990

9404042

LANDMARK RECLAMATION

WESTON MANAGERS DESIGNERS CONSULTANTS

L K TAYLOR

MARCIA GREEN

MLG - note P IV on p. 2. OK

Jackpile Reclamation Project

PUEBLO OF LAGUNA

P.O. BOX 194
LAGUNA, NEW MEXICO 87026

Reclamation Project Manager

(505) 552-6654
(505) 552-6655

RECE

AUG 2 9 1990

August 5, 1990

OR.

TO: Governor Conrad W. Lucero

FROM: Jim Olsen, Jr., P.E.-Reclamation Project Manager

SUBJ: EXECUTIVE SUMMARY-JULY, 1990 PROJECT STATUS REPORT

During the month of July, 1990, the following items were addressed:

I. OPERATIONS: Hauling protore across the highway continued with the truck fleet. The dozers phased out of the sloping work in the South Paguate and the scrapers moved in to take care of the remaining backfill requirements. The dozers were then moved to begin miscellaneous sloping packages remaining in the South Paguate area. Heavy rains caused some minor operational delays as these rains were of a greater magnitude than had been seen in recent years. A terrace installation was done by LCC to gain cost and operational data. Progress continues to run ahead of the baseline projected durations and below target prices. Detailed discussions on individual work items and their associated costs is in the Landmark/Weston report.

[redacted]

III. ENGINEERING ITEMS: Final slope lengths and distances for the terracing work were finalized by Weston's engineering staff. Some adjustment in slightly increasing the terrace drainage slopes was made to enhance drainage but will not affect the overall footage or corresponding cost. Mike Bone of Weston made a presentation to George Farris (BIA-Environmental Manager, Washington, D.C.) about the work on-going in the Special Cases and soil/revegetation findings of Ed Kelley. All outstanding engineering issues should be completed this summer and incorporated into the remaining Project planning. Developement of the 2nd Year Operating Plan & Schedule continued with a proposed target for Council presentation in September.

IV. OTHER ITEMS: Modification #2 (which eliminates the CMC role and reduces their assistance to consulting services as-directed) is being formally approved by the BIA. A draft proposal to establish and train two Reclamation Technicians to absorb many of the inspection and monitoring functions now performed by Landmark Reclamation was submitted for Council comment. Initial reaction from BIA personnel (George Farris) was that no real problem with this idea was seen but that it would probably require another modification to the Cooperative Agreement. The New Mexico State Highway Department continued their work on repairing and upgrading the old section of SR-279, especially following some of the intense rainfalls experienced in the area during July.

pc: Pueblo of Laguna Councilmen
David Sitzler-BLM/BIA

[redacted]

LANDMARK RECLAMATION

LANDMARK RECLAMATION/WESTON

JACKPILE RECLAMATION PROJECT

LAGUNA, NEW MEXICO

PROJECT STATUS REPORT

NO. 12

JULY, 1990

BY: JKP for

J. HARRISON
PROJECT MANAGER

SEE DISTRIBUTION LIST

One Tabor Center 1200 17th Street Suite 2500 Denver, Colorado 80202
303/595-0933

1.0 INDEX SHEET

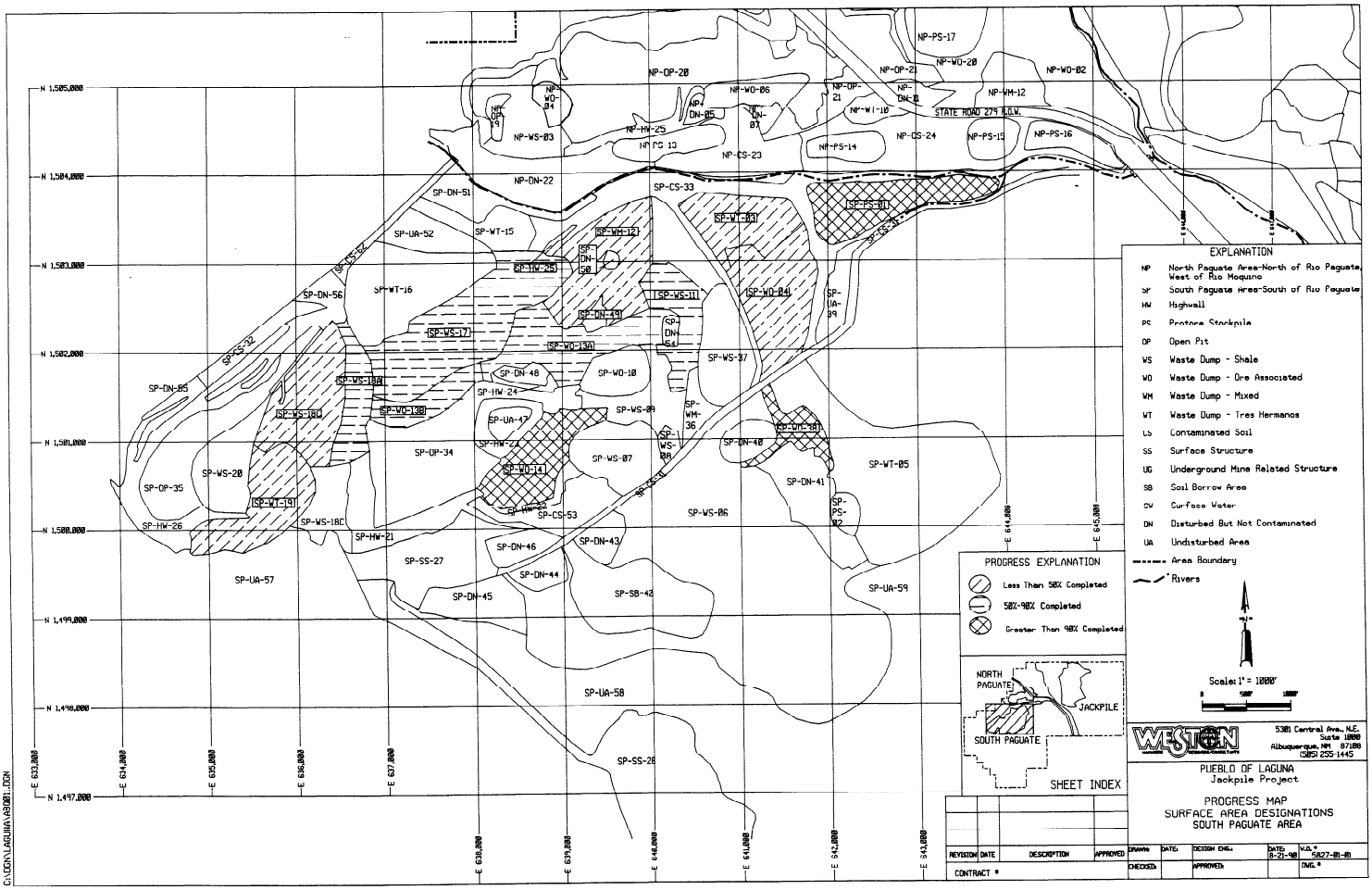
NOTE: NIC Denotes Not Included in This Report

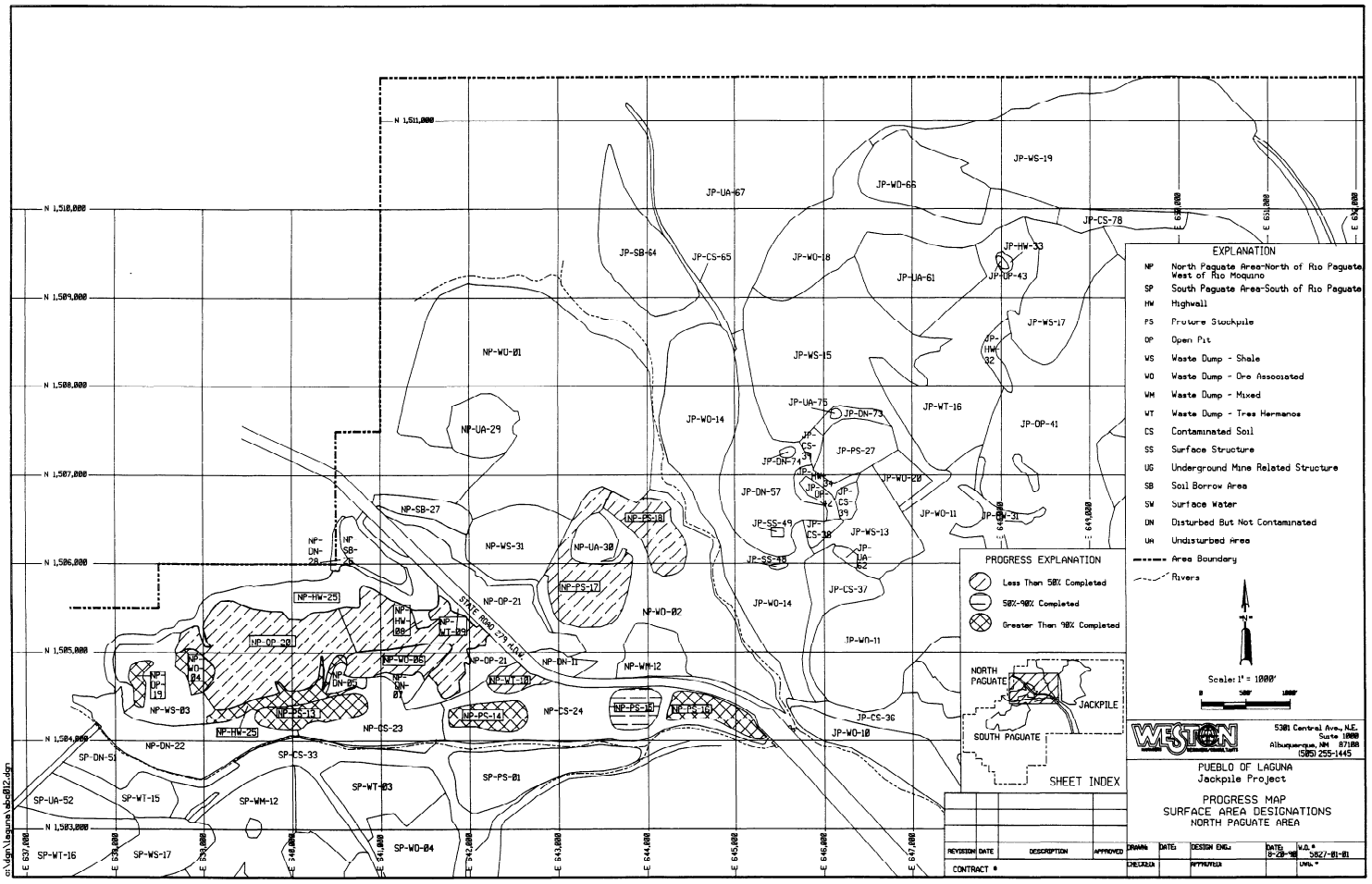
2.1 ABSTRACT

July, 1990 was the seventh month of full-scale earthmoving activities. The truck fleet continued to work Pile PS-17, hauling across the highway, after the scraper fleet was dedicated to cleanup of contaminated soils along the Rio Paguate and on the old mine haul roads. The scrapers then began working in OP-34 to supplement the backfill volume out of an adjacent ore-associated waste dump. The dozers were phasing out of their work in South Paguate areas 17, 13, and 18 and will be moving to the new work packages authorized in June. An experimental terrace was installed to gain operating data and technical feasibility for construction. The 2nd Year Operating Plan effort continued with the development of the terracing cost estimate and preliminary work schedules. Work on the identification of alternative topsoil sources and revised revegetation specifications began and will be done in August so the changes can be incorporated in future planning. Final design recommendations on the "Special Cases" should be done in August.

2.2 PROGRESS MAP

The attached progress maps indicate the percentages of completion for areas where work is being performed.





CONFIDENTIAL

POL-EPA01-0002800

2.3. Construction Photos

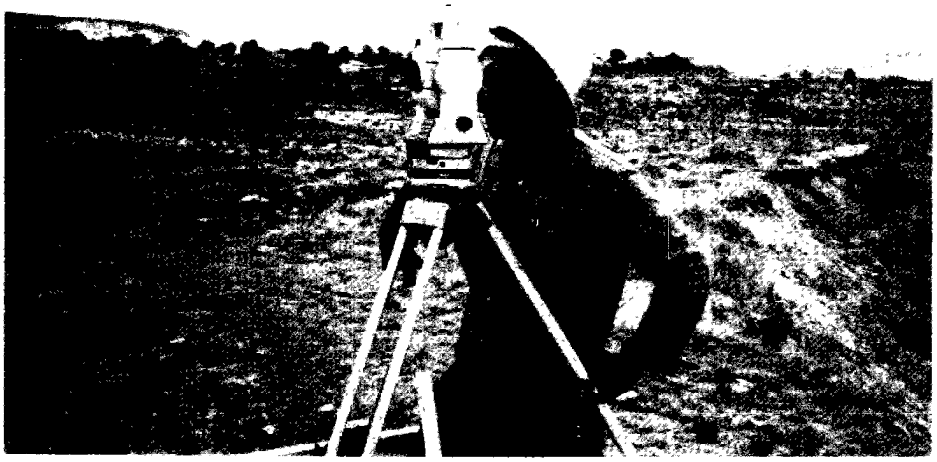


Figure 1. Surveying.

Figure 2. FELs/trucks on NP-PS-17.
Notice wet conditions.

2.3. Construction Photos

Figure 3. Another cut on SP-WS-17 fill for South Paguate Pit.

Figure 4. New sloping work on SP-WS-19.

2.3. Construction Photos

Figure 5. Picking up contaminated soil with scrapers from a haulage road--North Paguate Pit area.

Figure 6. End of tracks - and the bridge - at the Rio Moquino

2.3. Construction Photos

Figure 7. Leaving a tree while removing protore stockpile, NP-PS-18.

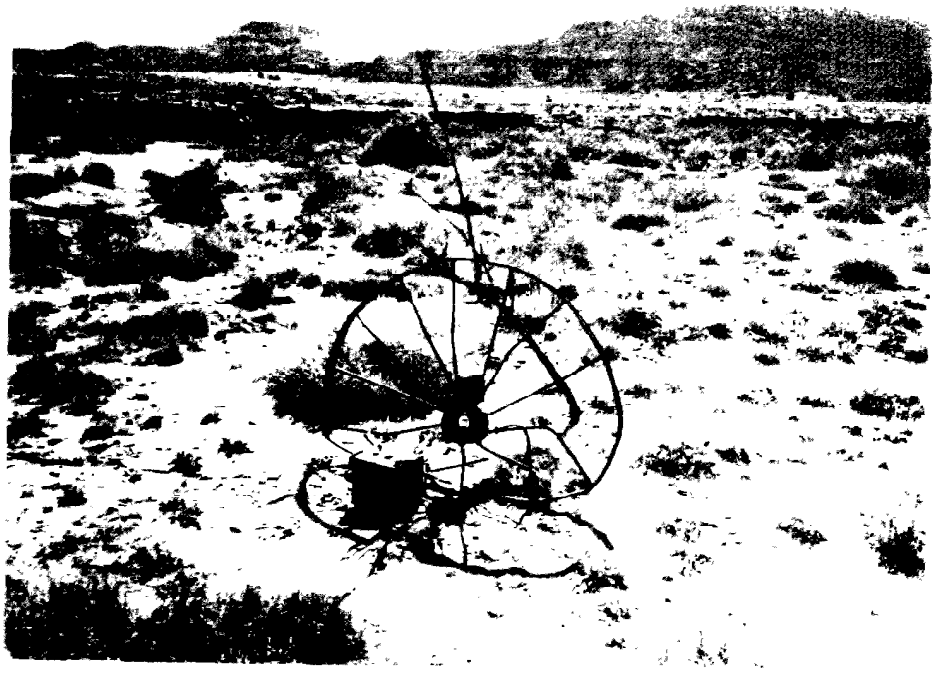


Figure 8. P2 station air particulate sampler.

2.4 MILESTONES

- Cleanup of contaminated soils on haul roads and along the Rio Paguate commenced in July.
- Terracing needs and cost estimates were developed based upon a trial installation.
- Radiation surveys for cleanup around the protore piles were completed and mapped.
- The scrapers began backfilling work in SP-OP-34 by hauling waste material from SP-WO-14.
- Governor Lucero, Roland Johnson, Sid Mills, George Farris, and Dave Sitzler (BIA/BLM officials) visited the Project Site on July 30.
- The volume of material handled by July, 1990 exceeded the projected volume contained in the 1st Year Operating Plan.
- Heavy rains during July were judged to be the heaviest in recent history and the July 13th event approached the magnitude of the August, 1988 100-year storm event.
- Ed Kelley & Stirling Grogan (sub-contractors to Roy F. Weston Engineering) began the work to finalize the revegetation specifications for the Project.

3.0 ACTION ITEMS

3.1 POL/RPM

1) Program weather station following training

2) Continue 2nd Year Planning effort

3) Modification #3 for change in Management responsibilities to increase POL's direct role

3.2 BIA/BLM

1) Formal approval of Modification #2 to the Cooperative Agreement

2) Funding of Ken King Services on Paguate Blast Damage Study

3) Assignment of "permanent" BIA Project Engineer

3.3 LANDMARK/WESTON

1) Work Package Closeouts/Final Inspections

2) Implement P-10 Closure Plan-pending BIA/BLM approval

3) Design/Cost Summary for "Special Cases"

4) Final specifications on soils and revegetation work

3.3 LAGUNA CONSTRUCTION COMPANY

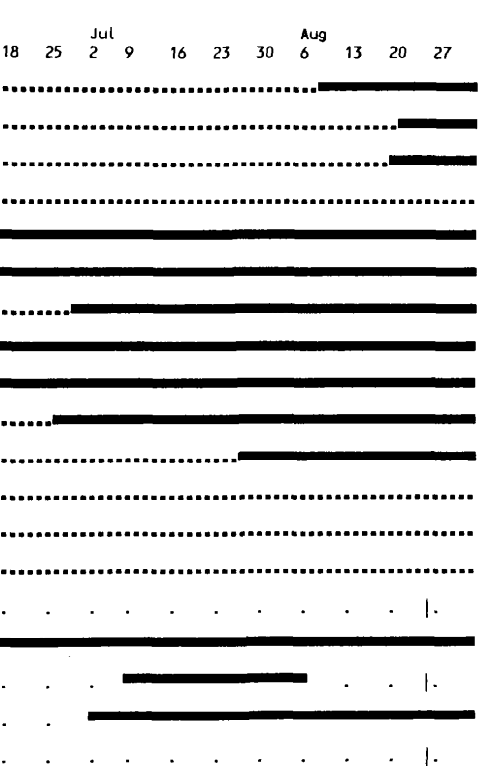
1) Refinement of 2nd Year Operating Schedule

2) Review and adjust equipment operating costs

3) Finalize terracing cost/foot estimate

Schedule Name : JACKPILE
Responsible : LCC
As-of Date : 24-Aug-90 Schedule File : C:\KIP\DATA\JACKPILE

WBS	Task Name	Duratn (Days)	Start Date	End Date	Total $ (EAC)	Pct Achvd
2E2S02	SP-WS-17 & 18	209	1-Dec-89	28-Sep-90	225,222.00	82
2E2S03	SP-WO-13B, WS-18A	157	16-Feb-90	28-Sep-90	788,573.00	82
2S2S01	DEWATER SP	138	9-Mar-90	21-Sep-90	93,920.00	82
2E1N06	NP-PS-16	180	23-Mar-90	7-Dec-90	257,759.00	95
	FILL NP-OP-20	270	1-Dec-89	28-Dec-90	0.00	0
	FILL SP-OP-34	85	1-Jun-90	1-Oct-90	0.00	0
1M1X01	HIGHWAY CLOSURE	270	1-May-90	28-May-91	45,000.00	15
2E1N10	NP-WT-10	163	1-May-90	21-Dec-90	102,067.00	11
2E1S02	SP-PS-02	149	21-May-90	21-Dec-90	90,504.00	0
2E2S11	SP-WT-19A	116	7-May-90	19-Oct-90	36,844.00	30
2E2S12	SP-WO-12	82	29-May-90	21-Sep-90	50,511.00	50
2E2S07	SP-WT-03	87	21-May-90	21-Sep-90	42,786.00	95
2E1N03	NP-PS-18	174	21-May-90	30-Jan-91	1,313,140.00	46
2E1N02	NP-PS-17	259	21-May-90	31-May-91	1,838,682.00	41
2E2N05	NP-WO-06	6	21-May-90	29-May-90	23,741.00	2
2E2S06	SP-WS-18C/WT-19	70	4-Jun-90	11-Sep-90	694,880.00	13
2E2S15	SP-WT-16/WT-37	21	9-Jul-90	6-Aug-90	32,091.00	0
2E4S04	SP-CS-33	85	2-Jul-90	31-Oct-90	0.00	0
2E2J14	JP-WO-11	120	1-Oct-90	26-Mar-91	668,614.00	0



Detail Task ≡≡≡≡≡ Summary Task ▲ Milestone
(Started) ≡≡≡≡≡ (Started) ▸▸▸ Conflict
(Slack) ≡≡≡— (Slack) Resource delay
Scale: 1 day per character

TIME LINE Gantt Chart Report, Strip 1, Page 1

4.2 PROJECT SCHEDULE

The truck fleet moved back into NP-PS-18 and will continue in this pile until late September, then haul the remainder of NP-PS-17 across the highway. The scraper fleet will continue hauling fill material out of SP-WO-14 to supplement the needed volume which will not be moved by dozers out of SP-13, 17 & 18. The dozers will then move to slope the remainder of the South Paguate dumps since most of the contaminated soil in SP-CS-33 is out of the way. Pushing material in SP-OP-35 continues rather than moving this material with scrapers as had been called for in the Jacobs plan. Dewatering of the South Paguate continues along with the backfilling operation. Some fencing work began with the procurement of materials (which should be adequate to also take care of the Jackpile side of the site.) Final disposition of the P-10 decline backfill is pending the approval of the BLM since the deteriorated condition has been judged to preclude as large a backfill amount as had originally been required. (See the Appendix for the detailed analysis & recommendations.)

5.1 TRACKING SUMMARY

Progress during July indicates an Estimated Variance At Completion of plus (+) $2,607,116.97. This an $126,491.11 improvement in projected savings over the past month.

JACKPILE
TRACKING SUMMARY

FY90
INTERIM
MOBILIZATION
ANNUAL OPERATING PLAN

JULY 1990

WBS ID NO.	WORK PACKAGE DESCRIPTION	TOTAL COST ESTIMATE	YTD ACTUAL COST	ACTUAL EQUIP CREDIT	ACTUAL CASH FLOW	REMAINING COST ESTIMATE	% OF ESTIMATE SPENT	REPORTED % COMPLETE	ESTIMATED VARIANCE AT COMPLETION
MGMT CA SUMMARY									
1P1	POL MANAGEMENT CA TOTAL	$110,859.00	$66,776 16	$0 00	$66,776 16	$44,083.44	60%	71%	$16,808.07
1P2	POL OTHER PROGRAMS CA TOTAL	$0.00	$0 00	$0.00	$0 00	$0.00	0%	0%	$0.00
1P	POL MANAGEMENT TASK TOTAL	$110,859.00	$66,776.16	$0.00	$66,776.16	$44,083 44	60%	71%	$16,808.07
1C1	CONSTRUCTION MANAGEMENT CA TOTAL	$540,694.10	$252,675.72	$0 00	$252,675 72	$288,018 38	47%	51%	$41,537 52
1C2	OTHER PROGRAMS CA TOTAL	$200,018 90	$205,116.43	$0.00	$205,116.43	($5,097.53)	103%	100%	($5,097.53)
1C	CONSTRUCTION MANAGEMENT TASK TOTAL	$740,713.00	$457,792 15	$0.00	$457,792.15	$282,920.85	62%	65%	$36,439.99
1	MANAGEMENT TOTAL	$851,572.00	$524,568.31	$0 00	$524,568 31	$327,004.29	62%	66%	$53,248 06
CONST CA SUMRY									
2L1	LCC COSTS CA TOTAL	$810,300 00	$536,500.00	$0.00	$536,500 00	$273,800.00	66%	66%	($2,578 79)
2L2	LCC START-UP COSTS CA TOTAL	$440,600 00	$370,298.00	$0.00	$370,298.00	$70,302 00	84%	100%	$70,302.00
2L	LCC ADMINISTRATION TASK TOTAL	$1,250,900.00	$906,798.00	$0.00	$906,798.00	$344,102.00	72%	77%	$67,723.21
2M1	MOBILIZATION CA TOTAL	$461,363 00	$417,178.94	$19 38	$417,159.56	($815.94)	90%	90%	($796 56)
2M2	LAND SURVEY CA TOTAL	$117,914 00	$72,130.98	$1,519.77	$70,611 21	$45,783.02	61%	72%	$19,842.88
2M3	LCC TRAINING CA TOTAL	$186,228 00	$112,817 39	$20 10	$112,797.29	$73,410 61	61%	65%	$12,693.71
2M	MOBILIZATION TASK TOTAL	$765,505.00	$602,127.31	$1,559.25	$600,568.06	$118,377 69	79%	82%	$31,740.02
2E1	BACKFILLING CA TOTAL	$6,513,397.00	$2,328,435.45	$535,301 67	$1,793,133 78	$4,184,961.55	36%	39%	$1,971,248.36
2E2	DUMP SLOPING CA TOTAL	$2,052,068.00	$592,092.60	$126,469.13	$465,623 47	$1,459,975 40	29%	33%	$656,998.84
2E3	COVER PLACEMENT CA TOTAL	$6,532 00	$194 07	$0.00	$194 07	$6,337 93	3%	3%	$0 00
2E4	CONTAMINATED SOIL CA TOTAL	$174,065.00	$80,348.10	$20,148 79	$60,199 31	$93,716 90	46%	16%	($199,382.55)
2E5	HIGHWALL CA TOTAL	$256,416.00	$58,321 27	$0.00	$58,321 27	$198,094 73	23%	23%	$2,253 46
2E6	EROSION CONTROL CA TOTAL	$0.00	$0 00	$0 00	$0.00	$0 00	0%	0%	$0 00
2E	EARTHWORK TASK TOTAL	$9,002,478.00	$3,059,391.49	$681,919.59	$2,377,471 90	$5,943,086.51	34%	36%	$2,431,118.11
2S1	UG ENTRIES ABANDON CA TOTAL	$122,215 00	$12,300.80	$10 00	$12,290 80	$109,914.20	10%	20%	$61,817.74
2S2	PIT WATER CA TOTAL	$416,990.00	$350,874 59	$94,811 74	$256,062.85	$66,115 41	84%	60%	($8,173 38)
2S3	SS DEMOLITION CA TOTAL	$175,829.00	$135,426.07	$3,641 12	$131,784 95	$40,402 93	77%	70%	($12,151.80)
2S4	SS DECON CA TOTAL	$0 00	$0 00	$0 00	$0 00	$0 00	0%	0%	$0.00
2S5	PERMANENT STRUCTURES CA TOTAL	$25,853.00	$440 58	$0 00	$440.58	$25,412 42	2%	1%	($18,205 00)
2S	STRUCTURES TASK TOTAL	$740,887.00	$499,042.04	$98,462.86	$400,579 18	$241,844.96	67%	56%	$23,287.56
2R1	SEEDING CA SUBTOTAL	$54,917.00	$0.00	$0 00	$0 00	$54,917 00	0%	0%	$0.00
2R2	IRRIGATION CA SUBTOTAL	$0 00	$0 00	$0 00	$0 00	$0 00	0%	0%	$0 00
2R	REVEGETATION TASK TOTAL	$54,917.00	$0 00	$0.00	$0 00	$54,917 00	0%	0%	$0.00
2	CONSTRUCTION TOTAL	$11,814,687 00	$5,067,358.84	$781,941.70	$4,285,417 14	$6,702,328 16	43%	46%	$2,553,868 90

	JACKPILE PROJECT SUMMARY								
1	MANAGEMENT TOTAL	$851,572 00	$524,568 31	$0 00	$524,568 31	$327,004 29	62%	66%	$53,248 06
2	CONSTRUCTION TOTAL	$11,814,687 00	$5,067,358 84	$781,941.70	$4,285,417 14	$6,702,328.16	43%	46%	$2,553,868.90
	GRAND TOTAL	$12,666,259 00	$5,591,927 15	$781,941 70	$4,809,985 45	$7,029,332 45	44%	48%	$2,607,116.97

WBS ID NO.	WORK PACKAGE DESCRIPTION	TOTAL COST ESTIMATE	YTD ACTUAL COST	ACTUAL EQUIP CREDIT	ACTUAL CASH FLOW	REMAINING COST ESTIMATE	% OF ESTIMATE SPENT	REPORTED % COMPLETE	ESTIMATED VARIANCE AT COMPLETION
POL MGMT									
1P1L01	PROJECT MANAGEMENT	$110,859 00	$66,776.16	$0 00	$66,776.16	$44,082 84	60%	71%	$16,808.07
1P1L02			$0 00	$0 00	$0 00	$0 00	0%	0%	$0.00
1P1L03			$0 00	$0 00	$0.00	$0 00	0%	0%	$0.00
1P1L04			$0.00	$0.00	$0 00	$0 00	0%	0%	$0.00
1P1L05			$0 00	$0.00	$0 00	$0 00	0%	0%	$0.00
1P1	POL MANAGEMENT CA TOTAL	$110,859.00	$66,776.16	$0.00	$66,776.16	$44,083 44	60%	71%	$16,808.07
A/E									
1P2L01	DESIGN AND SPECIFICATIONS		$0.00	$0 00	$0.00	$0.00	0%	0%	$0.00
1P2L02			$0.00	$0 00	$0 00	$0.00	0%	0%	$0.00
1P2	ENGINEERING CA TOTAL	$0.00	$0 00	$0 00	$0.00	$0.00	0%	0%	$0.00
1P	POL MANAGEMENT TASK TOTAL	$110,859.00	$66,776.16	$0.00	$66,776.16	$44,083.44	60%	71%	$16,808.07
CMC									
1C1L01	CONSTRUCTION MANAGEMENT: UB	$434,040.00	$231,020 91	$0.00	$231,020.91	$203,019.09	53%	65%	$21,502.86
1C1L02	INSPECTION QA/QC		$0.00	$0 00	$0.00	$0 00	0%	0%	$0.00
1C1L03	ENGINEERING		$0.00	$0 00	$0.00	$0 00	0%	0%	$0.00
1C1L04	COST/SCHEDULE CONTROL		$0.00	$0 00	$0 00	$0 00	0%	0%	$0.00
1C1L05A	ENVIRONMENTAL MONITORING: FY 90	$106,654 10	$21,654 81	$0.00	$21,654.81	$84,999 29	20%	25%	$20,034 86
1C1L06	CONTINGENCY		$0 00	$0.00	$0.00	$0.00	0%	0%	$0.00
1C1	CONSTRUCTION MANAGEMENT CA TOTAL	$540,694.10	$252,675.72	$0.00	$252,675.72	$288,018 38	47%	51%	$41,537 52
INTERIM CMC									
1C2L01	CONSTRUCTION MANAGEMENT	$116,337 65	$115,775.00	$0 00	$115,775 00	$562 65	100%	100%	$562 65
1C2L02	CMC PURCHASES	$5,392 35	$5,392 35	$0.00	$5,392 35	$0.00	100%	100%	$0.00
1C2L03B	ENVIRONMENTAL MONITORING: INTERIM	$78,288 90	$83,949.08	$0.00	$83,949 08	($5,660.18)	107%	100%	($5,660 18)
1C2	INTERIM CMC CA TOTAL	$200,018 90	$205,116 43	$0.00	$205,116 43	($5,097 53)	103%	100%	($5,097.53)
1C	CONSTRUCTION MANAGEMENT TASK TOTAL	$740,713.00	$457,792.15	$0.00	$457,792.15	$282,920 85	62%	65%	$36,439.99
1	MANAGEMENT TOTAL	$851,572.00	$524,568 31	$0.00	$524,568.31	$327,004 29	62%	66%	$53,248.06
LCC ADMIN									
2L1L01	LCC G&A	$810,300 00	$536,500 00	$0 00	$536,500 00	$273,800 00	66%	66%	($2,578 79)
2L1L02	LCC MARGIN		$0 00	$0 00	$0 00	$0 00	0%	0%	N/A
2L1	LCC COSTS CA TOTAL	$810,300 00	$536,500 00	$0 00	$536,500 00	$273,800 00	66%	66%	($2,578 79)
	LCC G&A MOBILIZATION	$119,100 0	$89,400 00	$0 00	$89,400 00	$29,700 00	75%	100%	$29,700 00

WBS ID NO.	WORK PACKAGE DESCRIPTION	TOTAL COST ESTIMATE	YTD ACTUAL COST	ACTUAL EQUIP CREDIT	ACTUAL CASH FLOW	REMAINING COST ESTIMATE	% OF ESTIMATE SPENT	REPORTED % COMPLETE	ESTIMATED VARIANCE AT COMPLETION
2L2L02	LCC INSURANCE: INTERIM	$145,500 00	$104,898 00	$0 00	$104,898 00	$40,602.00	72%	100%	$40,602 00
2L2L03	LCC ADMINISTRATIVE COSTS: INTERIM	$176,000 00	$176,000.00	$0.00	$176,000 00	$0 00	100%	100%	$0.00
2L2	LCC START-UP COSTS CA TOTAL	$440,600.00	$370,298 00	$0.00	$370,298.00	$70,302 00	84%	100%	$70,302.00
2L	LCC ADMINISTRATION TASK TOTAL	$1,250,900.00	$906,798.00	$0.00	$906,798.00	$344,102 00	72%	77%	$87,723.21
MOBILIZATION									
2M1L01			$0 00	$0.00	$0 00	$0.00	0%	0%	$0.00
2M1L05	SMALL TOOLS & SAFETY EQUIPMENT	$63,724 00	$61,934.04	$0.00	$61,934 04	$1,789.96	97%	100%	$1,789.96
2M1L06	REMODEL PROJECT/FIELD OFFICES	$46,520.00	$50,732 20	$0.00	$50,732 20	($4,212 20)	109%	100%	($4,212.20)
2M1L07	RECONDITION JOBSITE	$113,909 00	$113,909.36	$19.38	$113,889.98	($0.36)	100%	100%	$19.02
2M1L08	SET UP SHOP/MAINTENANCE FACILITIES	$192,210.00	$190,603.34	$0 00	$190,603.34	$1,606 66	99%	100%	$1,606.66
2M1X01 *	HIGHWAY CLOSURE/BARRICADING	$45,000.00							
2M1	MOBILIZATION CA TOTAL	$461,363.00	$417,178.94	$19 38	$417,159.56	($815.94)	90%	90%	($796.56)
LAND SURVEY									
2M2N01	LAND SURVEY NP AREA	$117,914.00	$72,130.98	$1,519.77	$70,611 21	$45,783.02	61%	72%	$19,842.88
2M2S01	LAND SURVEY SP AREA		$0.00	$0.00	$0 00	$0.00	0%	0%	$0.00
2M2J01	LAND SURVEY JP AREA		$0.00	$0.00	$0 00	$0.00	0%	0%	$0.00
2M2	LAND SURVEY CA TOTAL	$117,914.00	$72,130.98	$1,519.77	$70,611.21	$45,783.02	61%	72%	$19,842.88
TRAINING									
2M3L01	OPERATOR TRAINING: MOBILIZATION	$14,600 00	$0.00	$0 00	$0.00	$14,600.00	0%	100%	$14,600.00
2M3L02	OPERATOR TRAINING: EARTHWORK	$171,628 00	$112,817.39	$20.10	$112,797.29	$58,810.61	66%	65%	($1,906 29)
2M3	LCC TRAINING CA TOTAL	$186,228 00	$112,817.39	$20 10	$112,797 29	$73,410 61	61%	65%	$12,693 71
2M	MOBILIZATION TASK TOTAL	$765,505.00	$602,127.31	$1,559.25	$600,568.06	$118,377 69	79%	82%	$31,740.02
BACKFILLING									
2E1N01	NP HAUL ROADS AND RAMPS	$87,120.00	$87,120 86	$12,184.44	$74,936.42	($0 86)	100%	100%	$12,183.58
2E1N02	HAUL TO NP PIT: NP-PS-17	$1,838,682 00	$343,769 12	$90,245.69	$253,523 43	$1,494,912 88	19%	37%	$665,187.54
2E1N03	HAUL TO NP PIT: NP-PS-18	$1,313,140 00	$322,095 42	$88,749.19	$233,346.23	$991,044 58	25%	41%	$395,274.85
2E1N04	HAUL TO NP PIT: NP-PS-14	$413,123 00	$113,590 17	$30,389.74	$83,200.43	$299,532 83	27%	96%	$213,891.89
2E1N05	HAUL TO NP PIT: NP-PS-15	$408,830 00	$144,161 47	$33,927 65	$110,233 82	$264,668 53	35%	88%	$174,023.30
2E1N06	HAUL TO NP PIT: NP-PS-16	$257,759 00	$163,407.84	$39,889 15	$123,518 69	$94,351 16	63%	95%	$59,286 33
2E1N07	HAUL TO NP PIT: SP-PS-01	$1,616,723 00	$886,030 15	$213,963 59	$672,066 56	$730,692 85	55%	100%	$515,306.44
2E1N08	DELETED		$0 00	$0 00	$0 00	$0.00	0%	0%	$0 00
2E1N09	DELETED		$0.00	$0.00	$0 00	$0 00	0%	0%	$0 00
2E1N10	HAUL TO NP PIT: NP-WT-10	$102,067.00	$28,657 23	$2,516 52	$26,140 71	$73,409 77	28%	11%	($173,793.85)
2E1N11	HAUL TO NP PIT NP-PS-13	$149,157 00	$150,560 64	$18,071.14	$132,489 50	($1,403 64)	101%	100%	($14,403.50)
2E1N12	BACKFILL PIT: NP-OP-19	$148,393 00	$48,316.68	$0 00	$48,316.68	$100,076 32	33%	100%	$100,076 32
	NP BACKFILLING SUBTOTAL	$6,334,994 00	$2,287,709 58	$529,937.11	$1,757,772 47	$4,047,284 42	36%	40%	$1,947,032.90
2E1S01	CONSTRUCT SP HAUL ROADS	$87,899 00	$40,725 87	$5,364 56	$35,361 31	$47,173 13	46%	85%	$24,215 46
2E1S02	HAUL SP-PS-02 TO SP-OP-34	$90,504 00	$0 00	$0.00	$0 00	$90,504 00	0%	0%	$0 00
	SP BACKFILLING SUBTOTAL	$178,403 00	$40,725 87	$5,364 56	$35,361 31	$137,677.13	23%	23%	$24,215 46
2E1J01	CONSTRUCT JP HAUL ROADS & RAMPS		$0 00	$0 00	$0 00	$0 00	0%	0%	$0 00

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2E1J02	HAUL JP-PS-23 TO JP-OP-41		$0 00	$0 00	$0 00	$0.00	0%	0%	$0.00
2E1J03	HAUL JP-PS-24 TO JP-OP-41		$0 00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E1J04	HAUL JP-PS-25 TO JP-OP-41		$0.00	$0.00	$0.00	$0.00	0%	0%	$0 00
2E1J05	HAUL JP-PS-26 TO JP-OP-41		$0 00	$0.00	$0 00	$0.00	0%	0%	$0.00
2E1J06	HAUL JP-WO-10 TO JP-OP-41		$0 00	$0 00	$0 00	$0 00	0%	0%	$0 00
2E1J07	HAUL JP-PS-27 TO JP-OP-41		$0 00	$0.00	$0 00	$0 00	0%	0%	$0.00
2E1J08	HAUL JP-WO-07 TO JP-OP-41		$0 00	$0 00	$0 00	$0.00	0%	0%	$0.00
2E1J09	HAUL JP-WO-12 TO JP-OP-41		$0 00	$0 00	$0 00	$0.00	0%	0%	$0.00
2E1J10	HAUL JP-WS-08 TO JP-OP-41		$0 00	$0.00	$0 00	$0 00	0%	0%	$0.00
2E1J11	HAUL JP-WS-15 TO JP-OP-41		$0.00	$0.00	$0.00	$0 00	0%	0%	$0.00
2E1J12	HAUL JP-WO-71 TO JP-OP-41		$0 00	$0 00	$0 00	$0.00	0%	0%	$0.00
2E1J13	HAUL JP-WO-03 TO JP-OP-41		$0 00	$0.00	$0 00	$0.00	0%	0%	$0.00
2E1J14	HAUL JP-WS-13/WO-20 TO JP-OP-42		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E1J15	DELETED		$0.00	$0.00	$0 00	$0.00	0%	0%	$0.00
	JP BACKFILLING SUBTOTAL	$0 00	$0 00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E1	BACKFILLING CA TOTAL	$6,513,397.00	$2,328,435.45	$535,301.67	$1,793,133.78	$4,184,961 55	36%	39%	$1,971,248.36
DUMP SLOPING									
2E2N01	CUT NP-WO-01 SLOPES		$0 00	$0.00	$0 00	$0 00	0%	0%	$0.00
2E2N02	CUT NP-WO-02 SLOPES		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E2N03	CUT NP-WS-03 SLOPES		$0.00	$0 00	$0.00	$0 00	0%	0%	$0 00
2E2N04	CUT NP-WO-04 SLOPES	$24,959.00	$15,263.43	$3,406.72	$11,856 71	$9,695.57	61%	100%	$7,903 29
2E2N05	CUT NP-WO-06 SLOPES	$23,741 00	$494.43	$41.68	$452 75	$23,246 57	2%	2%	($8,821 50)
2E2N06	CUT NP-WT-09 SLOPES		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E2N07	REGRADE NP-DN-22		$0.00	$0.00	$0 00	$0.00	0%	0%	$0 00
2E2N08	CUT NP-WM-12 SLOPES	$14,262.00	$0.00	$0.00	$0 00	$14,262.00	0%	0%	$0.00
2E2N09	CUT NP-HW-25 SLOPES	$24,309 00	$7,071.87	$1,560 41	$5,511 46	$17,237.13	29%	100%	$16,364.54
	NP DUMP SLOPING SUBTOTAL	$87,271.00	$22,829.73	$5,008.81	$17,820.92	$64,441 27	26%	25%	$15,446 33
2E2S01	CUT SP-WO-13A/WO-10 SLOPES		$0 00	$0.00	$0 00	$0.00	0%	0%	$0.00
2E2S02	CUT SP-WS-17 SLOPES	$225,222.00	$97,465 50	$22,905 53	$74,559 97	$127,756.50	43%	82%	$87,379 21
2E2S03*	CUT SP-WO-13B/WS-18A SLOPES	$788,573.00	$350,617 74	$75,467.55	$275,150 19	$437,955.26	44%	82%	$288,754 99
2E2S04	CUT SP-WO-14 SLOPES	$54,671 00	$24,090.72	$5,621.00	$18,478 72	$30,571 28	44%	100%	$24,803 28
2E2S05	CUT SP-WS-18B SLOPES	$68,933 00	$0.00	$0.00	$0.00	$68,933 00	0%	0%	$0.00
2E2S06	CUT SP-WS-18C/WT-19 SLOPES	$694,880 00	$46,768.19	$10,515.69	$36,252 50	$648,111 81	7%	13%	$223,487 62
2E2S07	CUT SP-WT-03 SLOPES	$42,786.00	$13,532.48	$2,027 79	$11,504.69	$29,253 52	32%	95%	$21,762.80
2E2S08	CUT SP-WT-05 SLOPES		$0 00	$0 00	$0 00	$0 00	0%	0%	$0.00
2E2S09	CUT SP-WO-38 SLOPES	$2,377.00	$899.49	$197 80	$701 69	$1,477.51	38%	100%	$1,180 31
2E2S10	CUT SP-WS-06 SLOPES		$0 00	$0 00	$0.00	$0.00	0%	0%	$0.00
2E2S11	CUT SP-WT-19A SLOPES	$36,844.00	$9,895.30	$397.22	$9,498.08	$26,948 70	27%	30%	($2,491 27)
2E2S12	CUT SP-WO-12/WT-11 SLOPES	$50,511 00	$25,984 45	$4,327.74	$21,656 71	$24,526.55	51%	50%	($3,324 42)
2E2S13	CUT SP-WT-15A/WT-15B SLOPES		$0 00	$0 00	$0.00	$0 00	0%	0%	$0.00
2E2S14	DELETED		$0 00	$0.00	$0.00	$0 00	0%	0%	$0.00
2E2S15	CUT SP-WT-16/WT-37		$0 00	$0.00	$0 00	$0 00	0%	0%	$0 00
2E2S16	DELETED		$0 00	$0.00	$0 00	$0 00	0%	0%	$0 00
2E2S17	DELETED		$0 00	$0 00	$0.00	$0 00	0%	0%	$0.00
2E2S18	DELETED		$0 00	$0 00	$0 00	$0 00	0%	0%	$0.00
2E2S19	CUT SP-MISCELLANEOUS SLOPES		$0 00	$0 00	$0.00	$0 00	0%	0%	$0 00
	SP DUMP SLOPING SUBTOTAL	$1,964,797 00	$569,262 87	$121,460 32	$447,802 55	$1,395,534 13	29%	34%	$641,552 51
	CUT JP-WO-11 SLOPES		$0 00	$0 00	$0 00	$0 00	0%	0%	$0 00

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2E2J02	CUT JP-WT-16D SLOPES		$0 00	$0.00	$0 00	$0 00	0%	0%	$0.00
2E2J03	CUT JP-WS-17 SLOPES		$0 00	$0 00	$0 00	$0 00	0%	0%	$0.00
2E2J04	CUT JP-PS-22 SLOPES		$0.00	$0.00	$0 00	$0 00	0%	0%	$0.00
2E2J05	CUT JP-WO-72 SLOPES		$0 00	$0.00	$0 00	$0 00	0%	0%	$0.00
2E2J06	DELETED		$0 00	$0.00	$0.00	$0 00	0%	0%	$0.00
2E2J07	DELETED		$0 00	$0.00	$0 00	$0 00	0%	0%	$0.00
2E2J08	CUT JP-WS-01 SLOPES		$0.00	$0 00	$0 00	$0 00	0%	0%	$0.00
2E2J09	CUT JP-WT-02A/02B/02C SLOPES		$0.00	$0 00	$0 00	$0 00	0%	0%	$0.00
2E2J10	DELETED		$0.00	$0.00	$0 00	$0 00	0%	0%	$0.00
2E2J11	DELETED		$0.00	$0 00	$0.00	$0.00	0%	0%	$0.00
2E2J12	CUT JP-WO-06 SLOPES		$0.00	$0.00	$0 00	$0.00	0%	0%	$0.00
2E2J13	CUT JP-WS-08/12 SLOPES		$0.00	$0.00	$0 00	$0 00	0%	0%	$0.00
2E2J14	CUT JP-WO-11 SLOPES		$0.00	$0.00	$0.00	$0 00	0%	0%	$0.00
2E2J15	CUT JP-WS-15A/15B SLOPES		$0.00	$0 00	$0.00	$0.00	0%	0%	$0.00
2E2J16	DELETED		$0.00	$0.00	$0.00	$0 00	0%	0%	$0.00
2E2J17	CUT JP-WS-16A/16B/16C SLOPES		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E2J18	DELETED		$0.00	$0 00	$0.00	$0 00	0%	0%	$0.00
2E2J19	DELETED		$0 00	$0.00	$0 00	$0 00	0%	0%	$0 00
2E2J20	CUT JP-WO-14 SLOPES		$0 00	$0.00	$0 00	$0 00	0%	0%	$0.00
2E2J21	CUT JP-WS-19A SLOPES		$0.00	$0.00	$0 00	$0 00	0%	0%	$0.00
2E2J22	CUT JP-WS-19B SLOPES		$0.00	$0.00	$0 00	$0.00	0%	0%	$0.00
2E2J23	CUT JP-WS-19C SLOPES		$0.00	$0.00	$0 00	$0 00	0%	0%	$0.00
2E2J24	CUT JP-WO-66 SLOPES		$0.00	$0 00	$0.00	$0 00	0%	0%	$0.00
2E2J25	CUT JP-WO-70 SLOPES		$0 00	$0 00	$0.00	$0 00	0%	0%	$0.00
2E2J26	CUT JP-WO-18/66A SLOPES		$0.00	$0.00	$0 00	$0.00	0%	0%	$0.00
2E2J27	CUT JP-WO-18/66B SLOPES		$0.00	$0.00	$0.00	$0 00	0%	0%	$0.00
2E2J28	CUT JP-WO-18/66C SLOPES		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E2J29	CUT JP-WO-03A SLOPES		$0 00	$0.00	$0.00	$0 00	0%	0%	$0.00
2E2J30	CUT JP-WO-03B SLOPES		$0 00	$0 00	$0.00	$0 00	0%	0%	$0 00
2E2J31	CUT JP-WO-04A SLOPES		$0 00	$0.00	$0 00	$0 00	0%	0%	$0.00
2E2J32	CUT JP-WO-04B SLOPES		$0.00	$0 00	$0.00	$0 00	0%	0%	$0 00
2E2J33	CUT JP-WO-05A SLOPES		$0.00	$0.00	$0.00	$0.00	0%	0%	$0 00
2E2J34	CUT JP-WO-05B SLOPES		$0 00	$0.00	$0.00	$0 00	0%	0%	$0.00
	JP DUMP SLOPING SUBTOTAL	$0.00	$0.00	$0.00	$0.00	$0 00	0%	0%	$0 00
2E2	DUMP SLOPING CA TOTAL	$2,052,068 00	$592,092.60	$126,469.13	$465,623 47	$1,459,975.40	29%	33%	$656,988 84
COVER PLACEMENT									
2E3N01	HAUL SOIL FROM NP-SB-61 TO NP-D8		$0 00	$0 00	$0 00	$0 00	0%	0%	$0 00
2E3N02	HAUL SOIL FROM NP-SB-26 TO NP-D2		$0 00	$0 00	$0 00	$0 00	0%	0%	$0 00
2E3N03	HAUL SOIL FROM NP-SB-27 TO NP-D7		$0 00	$0 00	$0 00	$0 00	0%	0%	$0 00
2E3N04	HAUL SOIL FROM NP-SB-27 TO NP-D9		$0 00	$0 00	$0 00	$0 00	0%	0%	$0 00
2E3N05	HAUL SOIL FROM NP-SB-27 TO NP-D6		$194 07	$0 00	$194 07	($194 07)	0%	0%	$0.00
2E3N06	HAUL SOIL FROM NP-SB-61 TO NP-D9		$0 00	$0 00	$0 00	$0 00	0%	0%	$0.00
2E3N07	HAUL SOIL FROM SP-DN-61 TO NP-D4		$0 00	$0 00	$0 00	$0 00	0%	0%	$0 00
2E3N08	HAUL SOIL FROM SP-DN-61 TO NP-D1		$0 00	$0 00	$0 00	$0 00	0%	0%	$0 00
2E3N09	HAUL SOIL FROM SP-DN-61 TO NP-D3		$0 00	$0 00	$0 00	$0 00	0%	0%	$0 00
2E3N10	HAUL SOIL FROM SP-DN-61 TO NP-D5		$0 00	$0 00	$0 00	$0 00	0%	0%	$0 00
2E3N11	HAUL SOIL FROM SP-DN-61 TO NP-D10		$0 00	$0 00	$0 00	$0 00	0%	0%	$0 00
2E3N12	HAUL SHALE FROM NP-WS-31 TO NP-D6		$0 00	$0 00	$0 00	$0 00	0%	0%	$0 00

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2E3N13	HAUL SHALE FROM NP-WS-31 TO NP-D9		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3N14	DELETED		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3N15	DELETED		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3N16	HAUL SHALE FROM NP-WS-31 TO NP-D8		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3N17	HAUL SHALE FROM NP-WS-31 TO NP-D10		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3N18	HAUL SHALE FROM NP-WS-03 TO NP-D3		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3N19	HAUL SHALE FROM NP-WS-03 TO NP-D2		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3N20	DELETED		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3N21	HAUL SHALE FROM NP-WS-03 TO NP-D1		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
	NP COVER PLACEMENT SUBTOTAL	$0.00	$194.07	$0.00	$194.07	($194.07)	0%	0%	$0.00
2E3S01	HAUL SOIL FROM JP-SB-54 TO SP-D1		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3S02	HAUL SOIL FROM JP-SB-54 TO SP-D2		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3S03	HAUL SOIL FROM JP-SB-54 TO SP-D3		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3S04	HAUL SOIL FROM SP-SB-42 TO SP-D4		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3S05	HAUL SOIL FROM SP-SB-42 TO SP-D5		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3S06	HAUL SOIL FROM SP-SB-42 TO SP-D6		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3S07	HAUL SOIL FROM SP-SB-42 TO SP-D7		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3S08	HAUL SOIL FROM JP-SB-54 TO SP-D8		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3S09	HAUL SOIL FROM JP-SB-54 TO SP-D9		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3S10	HAUL SOIL FROM SP-SB-42 TO SP-D10		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3S11	HAUL SOIL FROM SP-SB-42 TO SP-D11		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3S12	HAUL SOIL FROM SP-SB-42 TO SP-D12		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3S13	HAUL SOIL FROM SP-SB-42 TO SP-D1		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3S14	HAUL SHALE FROM SP-WS-17 TO SP-13A		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3S15	HAUL SHALE FROM SP-WS-17 TO SP-13B		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3S16	HAUL SHALE FROM SP-WS-07 TO SP-01		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3S17	HAUL SHALE FROM SP-WS-07 TO SP-14		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3S18	HAUL SHALE FROM SP-WS-07 TO SP-04		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3S19	HAUL SHALE FROM SP-WS-07 TO SP-D10	$6,532.00	$0.00	$0.00	$0.00	$6,532.00	0%	0%	$0.00
2E3S20	HAUL SHALE FROM SP-WS-07 TO SP-38		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3S21	HAUL SHALE FROM SP-WS-07 TO SP-10		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
	SP COVER PLACEMENT SUBTOTAL	$6,532.00	$0.00	$0.00	$0.00	$6,532.00	0%	0%	$0.00
2E3J01	HAUL SOIL FROM JP-SB-53 TO D4		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3J02	HAUL SOIL FROM JP-SB-53 TO D5		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3J03	HAUL SOIL FROM JP-SB-53 TO D6		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3J04	HAUL SOIL FROM JP-SB-53 TO D9A		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3J05	HAUL SOIL FROM JP-SB-53 TO D1		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3J06	HAUL SOIL FROM JP-SB-53 TO D3		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3J07	HAUL SOIL FROM JP-SB-64 TO D2		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3J08	HAUL SOIL FROM JP-SB-64 TO D7		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3J09	HAUL SOIL FROM JP-SB-64 TO D11		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3J10	HAUL SOIL FROM JP-SB-64 TO D12		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3J11	HAUL SOIL FROM JP-SB-54 TO D16		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3J12	HAUL SOIL FROM JP-SB-54 TO D15		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3J13	HAUL SOIL FROM JP-SB-54 TO D14		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3J14	HAUL SOIL FROM JP-SB-54 TO D9B		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3J15	HAUL SOIL FROM JP-SB-54 TO D10		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3J16	HAUL SOIL FROM JP-SB-54 TO D13		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3J17	HAUL SOIL FROM JP-SB-54 TO D8B		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3J18	HAUL SHALE FROM JP-WS-19 TO D4		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00

WBS ID NO.	WORK PACKAGE DESCRIPTION	TOTAL COST ESTIMATE	YTD ACTUAL COST	ACTUAL EQUIP CREDIT	ACTUAL CASH FLOW	REMAINING COST ESTIMATE	% OF ESTIMATE SPENT	REPORTED % COMPLETE	ESTIMATED VARIANCE AT COMPLETION
2E3J19	HAUL SHALE FROM JP-WS-15 TO D1		$0 00	$0 00	$0 00	$0 00	0%	0%	$0.00
2E3J20	HAUL SHALE FROM JP-WS-15 TO D2		$0 00	$0 00	$0 00	$0 00	0%	0%	$0.00
2E3J21	HAUL SHALE FROM JP-WS-15 TO D7		$0 00	$0 00	$0.00	$0 00	0%	0%	$0.00
2E3J22	HAUL SHALE FROM JP-WS-15 TO D11		$0.00	$0 00	$0 00	$0 00	0%	0%	$0.00
2E3J23	HAUL SHALE FROM JP-WS-15 TO D12		$0 00	$0 00	$0 00	$0 00	0%	0%	$0.00
2E3J24	HAUL SHALE FROM JP-WT-02 TO D8A		$0.00	$0.00	$0 00	$0.00	0%	0%	$0.00
2E3J25	HAUL SHALE FROM JP-WT-02 TO D10		$0.00	$0 00	$0.00	$0 00	0%	0%	$0.00
2E3J26	HAUL SHALE FROM JP-WT-02 TO D13		$0 00	$0.00	$0 00	$0.00	0%	0%	$0.00
2E3J27	HAUL SHALE FROM JP-WT-02 TO D14		$0.00	$0 00	$0.00	$0 00	0%	0%	$0.00
2E3J28	HAUL SHALE FROM JP-WT-02 TO D15		$0 00	$0.00	$0.00	$0 00	0%	0%	$0.00
2E3J29	HAUL SHALE FROM JP-WT-02 TO D16		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
	JP COVER PLACEMENT SUBTOTAL	$0.00	$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E3	COVER PLACEMENT CA TOTAL	$6,532.00	$194.07	$0 00	$194.07	$6,337.93	3%	3%	$0.00
CONTAM SOIL EXV									
2E4NO1	HAUL CS FROM NP-CS-23/24 TO NP-OP-20		$0 00	$0.00	$0.00	$0.00	0%	0%	$0.00
	NP CONTAMINATED SOIL SUBTOTAL	$0.00	$0.00	$0.00	$0 00	$0 00	0%	0%	$0.00
2E4S01	FM SP-CS-27/28/31/33/53 TO SP-OP-34	$162,633.00	$80,348.10	$20,148.79	$60,199.31	$82,284 90	49%	20%	($199,382.55)
2E4S02	DELETED		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E4S03	DELETED		$0.00	$0.00	$0 00	$0 00	0%	0%	$0.00
2E4S04	DELETED		$0 00	$0 00	$0.00	$0.00	0%	0%	$0.00
2E4S05	DELETED		$0 00	$0 00	$0 00	$0.00	0%	0%	$0.00
2E4S06	DELETED		$0 00	$0.00	$0 00	$0.00	0%	0%	$0.00
2E4S07	HAUL CS FROM SP-CS-62/32 TO SP-OP-35	$11,432.00	$0.00	$0.00	$0 00	$11,432.00	0%	0%	$0.00
	SP CONTAMINATED SOIL SUBTOTAL	$174,065.00	$80,348.10	$20,148.79	$60,199.31	$93,716 90	46%	16%	($199,382.55)
2E4J01	HAUL CS FROM JP-CS-36 TO JP-OP-41		$0 00	$0.00	$0 00	$0 00	0%	0%	$0.00
2E4J02	HAUL CS FROM JP-CS-38/37 TO JP-OP-41		$0.00	$0.00	$0 00	$0 00	0%	0%	$0.00
2E4J03	DELETED		$0 00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E4J04	HAUL CS FROM JP-CS-39 TO JP-OP-42		$0 00	$0.00	$0.00	$0 00	0%	0%	$0.00
	JP CONTAMINATED SOIL SUBTOTAL	$0 00	$0 00	$0 00	$0 00	$0 00	0%	0%	$0.00
2E4	CONTAMINATED SOIL CA TOTAL	$174,065 00	$80,348.10	$20,148 79	$60,199 31	$93,716 90	46%	16%	($199,382.55)
HIGHWALL RECLAM									
2E5N01	TRIM NP HIGHWALLS	$67,698.00	$0 00	$0 00	$0.00	$67,698 00	0%	0%	$0.00
2E5N02	SCALE NP HIGHWALLS	$54,708 00	$0 00	$0.00	$0 00	$54,708.00	0%	0%	$0.00
	NP HIGHWALL SUBTOTAL	$122,406 00	$0.00	$0.00	$0 00	$122,406 00	0%	0%	$0.00
2E5S01	TRIM SP HIGHWALLS	$67,698 00	$29,160 64	$0 00	$29,160 64	$38,537.36	43%	50%	($4,487.28)
2E5S02	SCALE SP HIGHWALLS	$66,312 00	$29,160.63	$0 00	$29,160 63	$37,151.37	44%	50%	$6,740 74
	SP HIGHWALL SUBTOTAL	$134,010.00	$58,321 27	$0 00	$58,321 27	$75,688 73	44%	44%	$2,253.46
2E5J01	TRIM JP HIGHWALLS		$0 00	$0 00	$0 00	$0 00	0%	0%	$0.00
2E5J02	SCALE JP HIGHWALLS		$0.00	$0 00	$0 00	$0 00	0%	0%	$0.00
	JP HIGHWALL SUBTOTAL	$0 00	$0 00	$0.00	$0 00	$0 00	0%	0%	$0.00
2E5	HIGHWALL CA TOTAL	$256,416 00	$58,321 27	$0.00	$58,321 27	$198,094 73	23%	23%	$2,253.46
EROSION CONTROL									
2F6NO1	EROSION PROTECTION ROCK		$0 00	$0 00	$0 00	$0 00	0%	0%	$0 00
2F6NO2	RELOCATE RIO MOQUINO CHANNEL		$0 00	$0 00	$0 00	$0 00	0%	0%	$0 00

WBS ID NO.	WORK PACKAGE DESCRIPTION	TOTAL COST ESTIMATE	YTD ACTUAL COST	ACTUAL EQUIP CREDIT	ACTUAL CASH FLOW	REMAINING COST ESTIMATE	% OF ESTIMATE SPENT	REPORTED % COMPLETE	ESTIMATED VARIANCE AT COMPLETION
2E6NO3	PLACE BEDDING MATERIAL		$0.00	$0 00	$0.00	$0 00	0%	0%	$0.00
	RIO MOQUINO AND NP DITCH SUBTOTAL	$0.00	$0.00	$0 00	$0 00	$0.00	0%	0%	$0 00
2E6XO1	STRIP,QUARRY,DRILL,SHOOT ROCK		$0 00	$0.00	$0.00	$0 00	0%	0%	$0.00
2E6XO2	PROCESS SHOT ROCK		$0 00	$0 00	$0 00	$0 00	0%	0%	$0.00
	ROCK SUBTOTAL	$0.00	$0.00	$0.00	$0.00	$0 00	0%	0%	$0 00
2E6	EROSION CONTROL CA TOTAL	$0 00	$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2E	EARTHWORK TASK TOTAL	$9,002,478.00	$3,059,391.49	$681,919.59	$2,377,471.90	$5,943,086.51	34%	36%	$2,431,118.11
UG ENTRIES ABAN									
2S1N01	SEAL PW 2/3 UG ENTRY: NP SUBTOTAL	$317.00	$0.00	$0.00	$0.00	$317.00	0%	100%	$317.00
2S1SO1	SEAL P-13 ADIT	$13,316.00	$0.00	$0.00	$0 00	$13,316 00	0%	0%	$0.00
2S1SO2	SEAL P-10 DECLINE	$13,844 00	$0.00	$0.00	$0 00	$13,844.00	0%	0%	$0.00
2S1SO3	SEAL H-1 ADIT	$10,902.00	$476.07	$0.00	$476 07	$10,425.93	4%	100%	$10,425.93
2S1SO4	SEAL VENT HOLES	$56,640.00	$11,824.73	$10 00	$11,814 73	$44,815 27	21%	70%	$23,878.81
2S1SO5	PLUG DRILL HOLES	$27,196.00	$0 00	$0.00	$0 00	$27,196 00	0%	100%	$27,196.00
	SP UG ENTRIES ABANDON SUBTOTAL	$121,898.00	$12,300.80	$10.00	$12,290.80	$109,597 20	10%	20%	$81,500.74
2S1J01	SEAL JP-SS-50 ENTRIES		$0.00	$0.00	$0 00	$0.00	0%	0%	$0.00
2S1J02	SEAL JP-SS-46 ENTIRES		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
	JP UG ENTRIES ABANDON SUBTOTAL	$0.00	$0.00	$0.00	$0 00	$0.00	0%	0%	$0.00
2S1	UG ENTRIES ABANDON CA TOTAL	$122,215.00	$12,300 80	$10.00	$12,290.80	$109,914.20	10%	20%	$81,817.74
PIT WATER									
2S2N01	DISPOSE OF NP PIT WATER	$141,666 00	$161,935.47	$36,761.23	$125,174 24	($20,269 47)	114%	100%	$16,491 76
2S2S01	DISPOSE OF SP PIT WATER	$93,920.00	$100,930.40	$22,123.95	$78,806 45	($7,010.40)	107%	82%	($3,720.43)
2S2J01*	DISPOSE OF JP PIT WATER	$181,404.00	$88,008.72	$35,926 56	$52,082 16	$93,395 28	49%	28%	($20,944.71)
2S2	PIT WATER CA TOTAL	$416,990.00	$350,874.59	$94,811.74	$256,062 85	$66,115 41	84%	60%	($8,173 38)
SURF STRUC DEM									
2S3N01	DEMOLISH NP SURFACE STRUCTURES	$2,947 00	$1,172 41	$0 00	$1,172 41	$1,774.59	40%	100%	$1,774.59
2S3S01	DEMOLISH SP SURFACE STRUCTURES	$57,806.00	$33,497 32	$19.38	$33,477 94	$24,398 68	58%	58%	$175.41
2S3J01	DEMOLISH JP SURFACE STRUCTURES	$114,986.00	$100,756.34	$3,621.74	$97,134.60	$14,229 66	88%	93%	($14,101.81)
2S3	SS DEMOLITION CA TOTAL	$175,829 00	$135,426 07	$3,641.12	$131,784.95	$40,402 93	77%	70%	($12,151 80)
SURF STRC DECOM									
2S4XY	NOT ASSIGNED		$0 00	$0 00	$0 00	$0.00	0%	0%	$0.00
2S4	SS DECOM CA TOTAL	$0 00	$0 00	$0.00	$0 00	$0 00	0%	0%	$0.00
PERM STRUC									
2S5N01	CONSTRUCT PERMANENT ACCESS ROADS NP		$0 00	$0 00	$0 00	$0 00	0%	0%	$0.00
2S5N02	CONSTRUCT PERMANENT FENCES: NP AREA	$25,853 00	$440 58	$0 00	$440 58	$25,412 42	2%	1%	($18,205.00)
	NP STRUCTURES SUBTOTAL	$25,853 00	$440 58	$0 00	$440 58	$25,412 42	2%	1%	($18,205.00)
2S5S01	CONSTRUCT PERMANENT ACCESS ROADS SP		$0 00	$0 00	$0 00	$0 00	0%	0%	$0 00
2S5S02	CONSTRUCT PERMANENT FENCES. SP AREA		$0 00	$0 00	$0 00	$0 00	0%	0%	$0.00
	SP STRUCTURES SUBTOTAL	$0 0	$0 00	$0 00	$0 00				$0 00

WBS ID NO.	WORK PACKAGE DESCRIPTION	TOTAL COST ESTIMATE	YTD ACTUAL COST	ACTUAL EQUIP CREDIT	ACTUAL CASH FLOW	REMAINING COST ESTIMATE	% OF ESTIMATE SPENT	REPORTED % COMPLETE	ESTIMATED VARIANCE AT COMPLETION
2S5J01	CONSTRUCT PERMANENT ACCESS ROADS SP		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2S5J02	CONSTRUCT PERMANENT FENCES, SP AREA		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
	JP STRUCTURES SUBTOTAL	$0.00	$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2S5	PERMANENT STRUCTURES CA TOTAL	$25,853.00	$440.58	$0.00	$440.58	$25,412.42	2%	1%	($18,205.00)
2S	STRUCTURES TASK TOTAL	$740,887.00	$499,042.04	$98,462.86	$400,579.18	$241,844.96	67%	56%	$23,287.56
SEEDBEDS									
2R1N01	PREPARE BED & SEED NP FLAT AREAS		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2R1N02	PREPARE BED & SEED NP SLOPE AREAS		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
	NP SEEDING SUBTOTAL	$0.00	$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2R1S01	PREPARE BED & SEED SP FLAT AREAS		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2R1S02	PREPARE BED & SEED SP SLOPE AREAS		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2R1S03	RESEED AT HOUSING AREA	$54,917.00	$0.00	$0.00	$0.00	$54,917.00	0%	0%	$0.00
	SP SEEDING SUBTOTAL	$54,917.00	$0.00	$0.00	$0.00	$54,917.00	0%	0%	$0.00
2R1J01	PREPARE BED & SEED JP FLAT AREAS		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2R1J02	PREPARE BED & SEED SP SLOPE AREAS		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
	JP SEEDING SUBTOTAL	$0.00	$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2R1	SEEDING CA SUBTOTAL	$54,917.00	$0.00	$0.00	$0.00	$54,917.00	0%	0%	$0.00
IRRIGATION									
2R2N01	IRRIGATE NP AREA PIT SLOPES		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2R2S01	IRRIGATE SP AREA SLOPES		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2R2J01	IRRIGATE JP AREA SLOPES		$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2R2	IRRIGATION CA SUBTOTAL	$0.00	$0.00	$0.00	$0.00	$0.00	0%	0%	$0.00
2R	REVEGETATION TASK TOTAL	$54,917.00	$0.00	$0.00	$0.00	$54,917.00	0%	0%	$0.00
2	CONSTRUCTION TOTAL	$11,814,687.00	$5,067,358.84	$781,941.70	$4,285,417.14	$6,702,328.16	43%	46%	$2,553,868.90

5.2 WORK PACKAGE DISCUSSION

WP#	DESCRIPTION	REMARKS
1C1L01	Engineering	On-going; final designs done this summer
1C1L05	Environmental	On-going
2L1L01	G & A	On-going
2M2N01	Surveying	On-going
2E1N01	Construct NP haul roads	Substantially complete
2E1N04	NP-PS-14 to pit	Substantially complete needs minor cleanup
2E1N11	NP-PS-13 to pit	Substantially complete needs minor cleanup
2E1N06	NP-PS-16 to pit	Small amount of boulders need to be hauled to pit
2E1N02	NP-PS-17 to pit	Work stopped until PS-18 is completed
2E1N03	NP-PS-18 to pit	Hauling across highway with belly-dumps to continue into fall
2E1N07	SP-PS-01 to pit	Eberline radiation survey shows it complete; ready for shale & soil covers
2E1N10	NP-WT-10 to pit	Final cleanup when the highway is re-opened
2E2N05	NP-WO-06 slopes	Substantially complete
2E2N09	NP-HW-25 highwall	Pending trim work when NP backfill is done
2E2S02,03	SP-17, 13, 18A	Dozers substantially complete; scrapers will handle remaining backfill volume out of SP-WO-14
2E2S06	SP-WS-18C,19 slopes	Sloping into OP-35
2E2S07	SP-WO-O3 slopes	Sloping to continue now that CS-33 is done

5.2 WORK PACKAGE DISCUSSION
(Continued)

WP#	DESCRIPTION	REMARKS
2E2S11	SP-WT-19 A slopes	East side finished to 3:1 slopes; west side being pushed into OP-35
2E2S12	SP-WM-12/WS-11 slopes	One half-completed sloping to continue since contaminated soil has been cleared
2E4S01	Demo SP-22,27,31,22	Mislabeled; work package to cover SP contaminated soil cleanup; ongoing thru fall months
2E5S01	Trim SP highwalls	Blasting costs only to-date
2E5S02	Scale SP highwalls	Same as above
2E5N01,02	Trim/scale NP highwalls	Being re-scheduled; no activity to-date
2S1S02	Seal P-10 decline	Final recommendation from J. Harrison; BLM reviewing plan
2S1S04	Seal Vent holes	Two holes remaining in Jackpile area; dozer work needed to re-establish access
2S2S01	Dewater South Paguate	On-going thru summer
2S3S01	Demolish SP structures	Awaiting final decision on building disposition
2S3J01	Demolish JP structures	Power poles and crusher demolition remaining
2S5N02	NP fencing	Pending rescheduling
2R1S03	Reseed housing area	Pending revised revegetation specifications
1C1X01	Barricading Detour	On-going until 5/31/91

5.3 WORK PACKAGE CLOSEOUTS

1) Items submitted by LCC, Inc. for Final Inspection/Closeout:

NONE in July, 1990

2) Items submitted by Pueblo of Laguna to BIA for final closeout:

WP #	DESCRIPTION	REMARKS
2E1N11	Sloping NP-OP-19	Done during Interim work phase in October, 1989; spent 33% of estimated cost;
2S3S01	Demolition of North Paguate structures	Mobilization Work begun in Fall, 1989; spent 40% of estimated cost;
2S2N01	Dewater N. Paguate	Mobilization Work begun in Fall, 1989; spent 14% over the estimated cost;
2M2N01	Land Surveying-North Paguate area	No charges; authorized amount of $18,800 in Mobilization Work was consolidated into the 2M2N01 for the 1st Year Operating Plan; this closes out the Mobilization surveying charges ONLY.

5.4 CHANGE ORDER SUMMARY

NONE for July, 1990

6.1 PERFORMANCE MEASUREMENT

Actual work continues around 1.5 months ahead of the baseline schedule and costs continue to track at about 70% of budget. Utilization of equipment in different combinations and haulage situations continues to maximize productivity and keep unit costs low.

Heavy rains contributed to some operating problems requiring haul road repairs and slope washouts but were not as detrimental as would have been thought given the magnitude of the moisture received during July. Cash flows continue to track with original projections and no problems in this area are foreseen for the remainder of the 1st Operating Year.

7.0 APPENDIX A: SPECIAL REPORTS/PLANS

1) Jim Harrison-Landmark Reclamation

Monthly Inspection Summary-July, 1990

2) Rio Moquino-Revised Design Concept
Summary and Material Handling Requirements
(alternative to re-channelization option)

3) Erosion Control Devices: Latest State-of-the-Art Products

4) Report of Investigation of the P-10 Decline--Jackpile Project
by Jim Harrison-Engineering Services Contractor/Landmark
Reclamation

5) Health & Safety Audit of the Laguna Construction Company-
Jackpile Reclamation Project by: Bill Almas-Landmark Reclamation

7.1 MONTHLY INSPECTION SUMMARY

LANDMARK RECLAMATION

DATE: August 8, 1990

TO: Jim Olsen Jr., P.E. - Reclamation Project Manager

FROM: Jim Harrison, Engineering Services

RE: Inspection Report, Month of July, 1990: Jackpile Reclamation Project.

The month was characterized by heavy rains -- a particular large rainfall occured on friday the 13th. Not only did this slow production; but more importantly, from our point of view, the rains stressed the surfaces left by excavated protore stockpiles and sloping giving us an idea as to the effectiveness of our efforts.

Support was washed out from under the pipeline where it crosses the Rio Moquino; causing it to collapse and break. However, damage was averted because LCC was not pumping at the time.

Most of the berms or sloping away from the tops of slopes diverted water away from slopes. Excess water, for example, did not flow into open pit 19. There is one exception. Water carved a large channel through the middle of SP-WS-38 where we did not have a berm.

LCC decided to cut more yardage from SP-WS-17 to make up for the yardage, that was not there, from slope work on SP-WS-18A. They cut more than 300,000 cubic yards and were nearly done by the end of the month. The toe was temporarily left higher than final grade to control surface water runoff.

All the excavated protore stockpiles, including those mentioned above, were staked on 200-foot centers, and measured for surface radioactivity. Those readings above 10X background pin point contaminated zones that were mapped and given to LCC. LCC will excavate these zones in six inch lifts until the contamination above the limit is removed. The readings on excavated SP-PS-01 were all below the limit.

We swapped out the TLD badges -- the semi annual change.

One monitor well, #8, that did not recharge enough to give an adequate ground water sample, was developed to flow at an estimated rate of 1/2 GPM, which was enough for taking the sample.

PO Box 193 Laguna, New Mexico 87026
(505) 242-0506

7.2 RIO MOQUINO QUANTITY ESTIMATES

WESTON
MANAGERS DESIGNERS/CONSULTANTS
5301 CENTRAL AVENUE, N.E.
SUITE 1000
ALBUQUERQUE, NM 87108
PHONE (505) 255-1445

August 6, 1990

Pueblo of Laguna
Attn: Jim H. Olsen
P.O. Box 194
Laguna, NM 87026

Re: Rio Moquino Quantity Estimates
Jackpile Reclamation Project
RFW WO# 5827-01-01

Dear Jim:

As a follow-up to the Rio Moquino design concept presented on July 25, 1990, the following attachment is a summary of the rough quantities estimated for the effort involved. These quantities are provided in order that unit prices can be estimated by Laguna Construction Company and used to support revisions to work packages.

The following two items are noted:

1. The use of gabions for additional erosion control is not an absolute criterion but is effective for estimating purposes. There are a variety of products on the market such as interlocking concrete blocks or geomatrix materials that would serve the same purpose. The most cost effective approach should be considered.

2. Accurate topography is not available along the channel of the Rio Moquino. It is noted that item #6 of the Quantity Summary Sheet is an uncertain quantity. The estimation of this quantity depends on the location of the toe of the waste pile with relation to the top of the stream bank.

Should you require further clarification, please contact me.

Sincerely,

ROY F. WESTON, INC.

Michael J. Bone, P.E.
Chief Design Engineer

MJB/db

polriomq

SUMMARY SHEET FOR THE RIO MOQUINO

1) Gabion Protection

   A) 1,110 gabion cages
   B) 5,940 cy of rock
      a) 4,440 cy (Gabion rock)
      b) 1,500 cy (Rock for toe of gabions)
   C) 5,400 cy cut for gabion installation

2) Rock Protection for Toe of Waste Pile
   A) 4,250 cy

3) Lower Bench Cut for Waste Pile (West Side of Rio Moquino)
   A) 530,000 cy

4) Upper Bench Cut on the Northern End of Waste Pile
   A) 45,000 cy

5) Bench Cuts on the East Side of the Rio Moquino
   A) 116,500 cy

6) Removal of the Toe of Waste Pile on the West Side of the Rio Moquino
   A) 200,500 cy

* See calc. sheets 1 through 4 for specific details.

CALC. SHEETS

WESTON SM
MANAGERS DESIGNERS/CONSULTANTS

SHEET 1 of 4

CLIENT/SUBJECT JACKPILE W.O. NO. 5827-01-01

TASK DESCRIPTION RIO MOQUINO (WESTON REVISED) TASK NO.

PREPARED BY M. McVEY DEPT DATE

MATH CHECK BY DEPT DATE

METHOD REV. BY DEPT DATE

APPROVED BY MJ Bone

DEPT W642 DATE 8-6-90

1) GABION PROTECTION

a) TOTAL LENGTH OF PROTECTION NEEDED:

250
450
375
350
1100
350
600
300
300
4,050 ft

b) NUMBER OF CAGES NEEDED:

3' x 3' x 12' CAGES

4,050 / 12 = 337.5

+ 10%.

= 370 CAGES

370 CAGES X 3 HIGH = 1,110 CAGES

c) ROCK FOR CAGES:

3' x 3' x 12' = 108 ft³

108 ft³ / 27 = 4 cy

4 cy / CAGE X 1,110 CAGES = [illegible]

CLIENT/SUBJECT _____ W.O. NO. _____

TASK DESCRIPTION _____ TASK NO. _____

PREPARED BY _____ DEPT _____ DATE _____ | APPROVED BY

MATH CHECK BY _____ DEPT _____ DATE _____ |

METHOD REV. BY _____ DEPT _____ DATE _____ | DEPT _____ DATE _____

d) Rock Protection for Toe of Gabions:

1' x 10' x 4,050' = 40,500 ft³

40,500 ft³ / 27 = 1500 cy

e) Cut for Cages:

6' x 6' x 4,050' = 145,800 ft³

145,800 ft³ / 27 = 5,400 cy

2) Additional Rock Protection at Toe of Waste Pile Slope

a) Total Length of Protection Needed:

375
450
150
1650
400
250
250
300
3,825 ft

b) Rock for Toe Protection:

3' x 10' x 3,825' = 114,750 ft³

114,750 ft³ / 27 = 4250 cy

CLIENT/SUBJECT _____ W.O. NO. _____

TASK DESCRIPTION _____ TASK NO. _____

PREPARED BY _____ DEPT _____ DATE _____

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY

DEPT _____ DATE _____

3) LOWER BENCH CUT FOR WASTE PILE

$50' \times 50' \times 5{,}700' = 14{,}250{,}000\ ft^3$

$14{,}250{,}000\ ft^3 / 27 = \underline{530{,}000\ cy}$

4) UPPER BENCH CUT ON NORTHERN END OF PILE

$30' \times 30' \times 1{,}350' = 1{,}215{,}000\ ft^3$

$1{,}215{,}000\ ft^3 / 27 = \underline{45{,}000\ cy}$

5) BENCH CUTS ON EAST SIDE OF RIO MOQUINO

a) $50' \times 50' \times 750' = 1{,}875{,}000\ ft^3$

$1{,}875{,}000\ ft^3 / 27 = \underline{69{,}500\ cy}$

b) $30' \times 30' \times 600' = 540{,}000\ ft^3$

$540{,}000\ ft^3 / 27 = \underline{20{,}000\ cy}$

c) $30' \times 30' \times 800' = 720{,}000\ ft^3$

$720{,}000\ ft^3 / 27 = \underline{27{,}000\ cy}$

CLIENT/SUBJECT _____ W.O. NO. _____

TASK DESCRIPTION _____ TASK NO. _____

PREPARED BY _____ DEPT _____ DATE _____ | APPROVED BY

MATH CHECK BY _____ DEPT _____ DATE _____ |

METHOD REV. BY _____ DEPT _____ DATE _____ | DEPT _____ DATE _____

6) REMOVAL OF TOE OF WASTE PILE 50 ft FROM EDGE OF STREAM BANK (WEST SIDE)

a) 50' VERT. / 1,200' LENGTH

$V = (.5)(50')(50')(1{,}200') = 1{,}500{,}000\ ft^3$

$1{,}500{,}000\ ft^3 / 27 = 55{,}500\ cy$

b) 40' VERT / 2,475' LENGTH

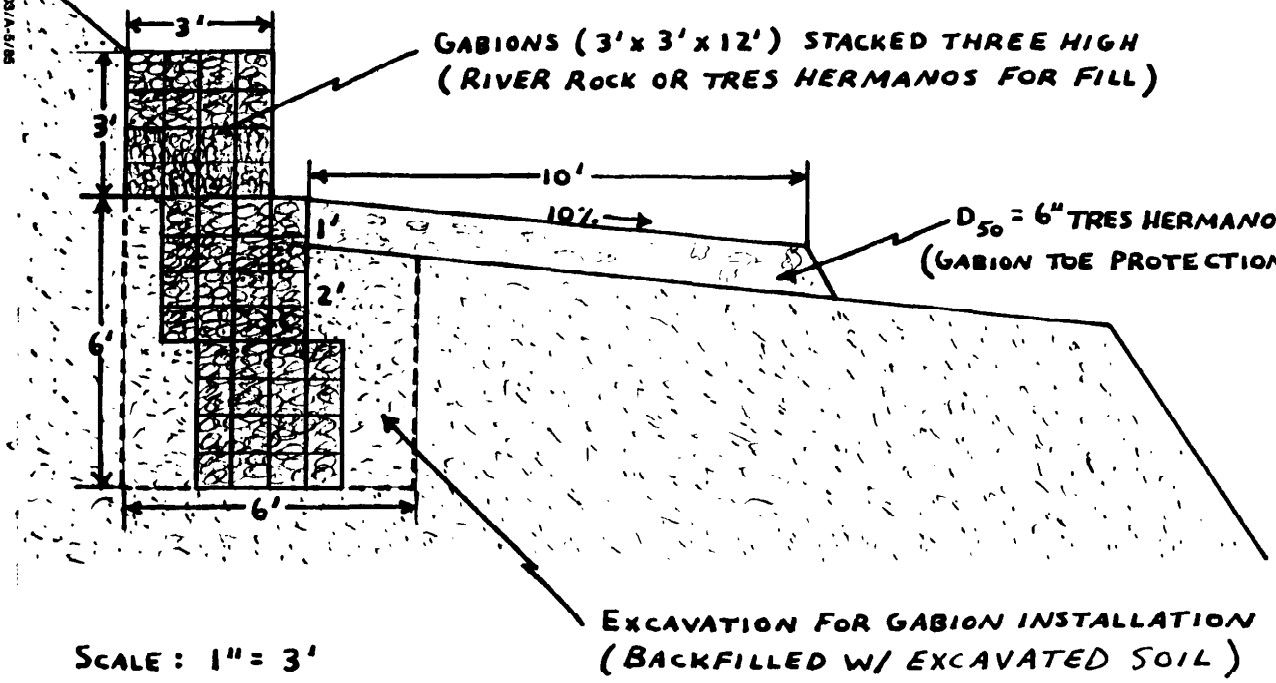
$V = (.5)(50')(40')(2{,}475') = 2{,}475{,}000\ ft^3$

$2{,}475{,}000\ ft^3 / 27 = 92{,}000\ cy$

c) 40' VERT / 1,425' LENGTH

$V = (.5)(50')(40')(1{,}425') = 1{,}425{,}000\ ft^3$

$1{,}425{,}000\ ft^3 / 27 = 53{,}000\ cy$



SCALE: 1" = 3'

DETAIL OF GABION CONSTRUCTION

CLIENT/SUBJECT _____ W.O. NO. _____ SHEET ___ of ___

TASK DESCRIPTION _____ TASK NO. _____

PREPARED BY _____ DEPT _____ DATE _____

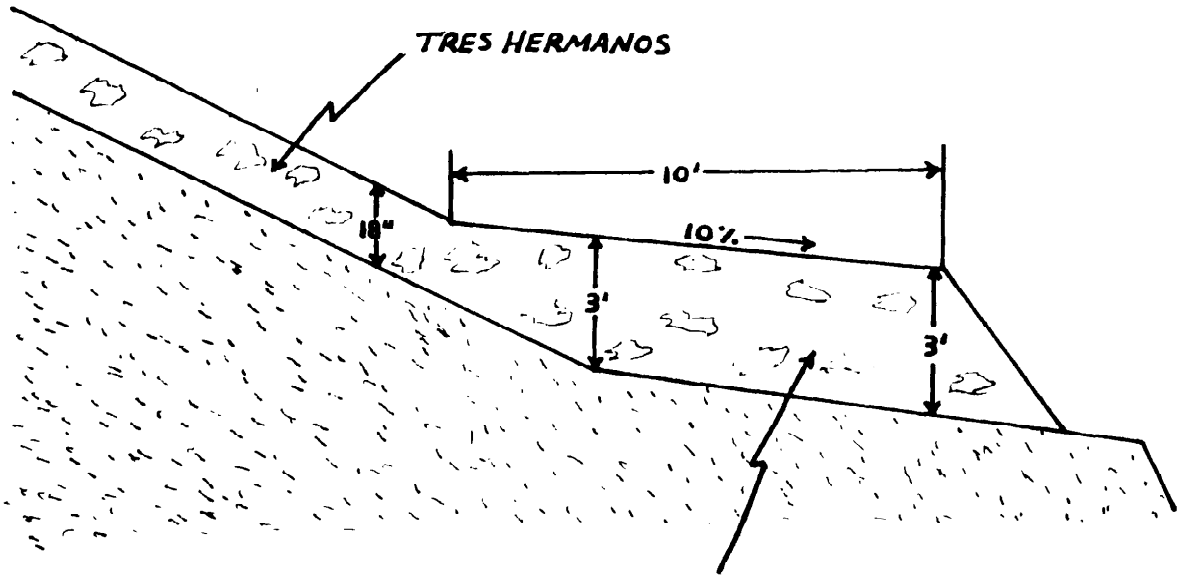
MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY

DEPT _____ DATE _____

RFW 10-05-003/A-5/85



SCALE : 1" = 3'

D_{50} = 6" TRES HERMANOS
(WASTE PILE TOE PROTECTION)

THICKENED ROCK TOE PROTECTION

CLIENT/SUBJECT _____ W.O. NO. _____ SHEET ___ of ___

TASK DESCRIPTION _____ TASK NO. _____

PREPARED BY _____ DEPT _____ DATE _____

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY

DEPT _____ DATE _____

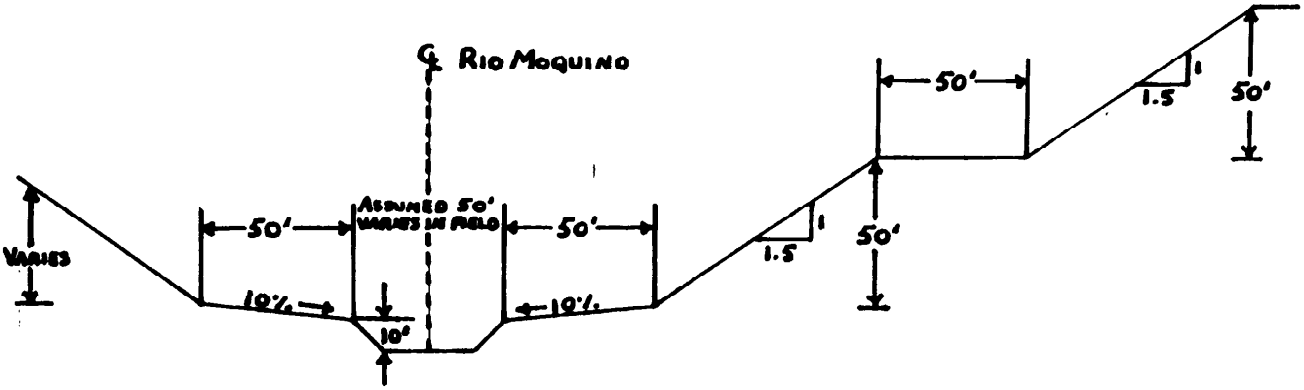
WESTON SM

RFW 10-05-003/A-5/85

RFW 10-25-003/A-5/85

RIO MOQUINO CROSS-SECTION
LOOKING DOWNSTREAM

SCALE: 1" = 50'



CLIENT/SUBJECT _____ W.O. NO. _____

TASK DESCRIPTION _____ TASK NO. _____ SHEET ___ of ___

PREPARED BY _____ DEPT _____ DATE _____

MATH CHECK BY _____ DEPT _____ DATE _____

METHOD REV. BY _____ DEPT _____ DATE _____

APPROVED BY

DEPT _____ DATE _____

APPROXIMATE SAVINGS

Prior to the redesign effort, the Rio Moquino Rechannelization Work Package was fixed with regard to the balanced cut and fill sloping effort of the adjacent waste pile. The result was a 3h:1v waste pile slope that would have caused the channel to be relocated. In addition, the use of one large channel to carry flood flows would necessitate excessive amounts of large-sized riprap.

The philosophy of the redesign revolves around the use of a benched waste pile slope as described in the "Final Waste Pile Slope Design" recently submitted to and approved by the Bureau of Indian Affairs.

The use of a benched slope provides the flexibility necessary to stabilize the waste pile slope **without** relocating the Rio Moquino channel. An additional design feature involves the use of a smaller channel with overbank flow areas. This added change drastically reduces the amount and size of rock erosion protection required. Options are also being evaluated into the use of man-made products that would be just as suitable as large riprap and economically more viable and aesthetically as acceptable.

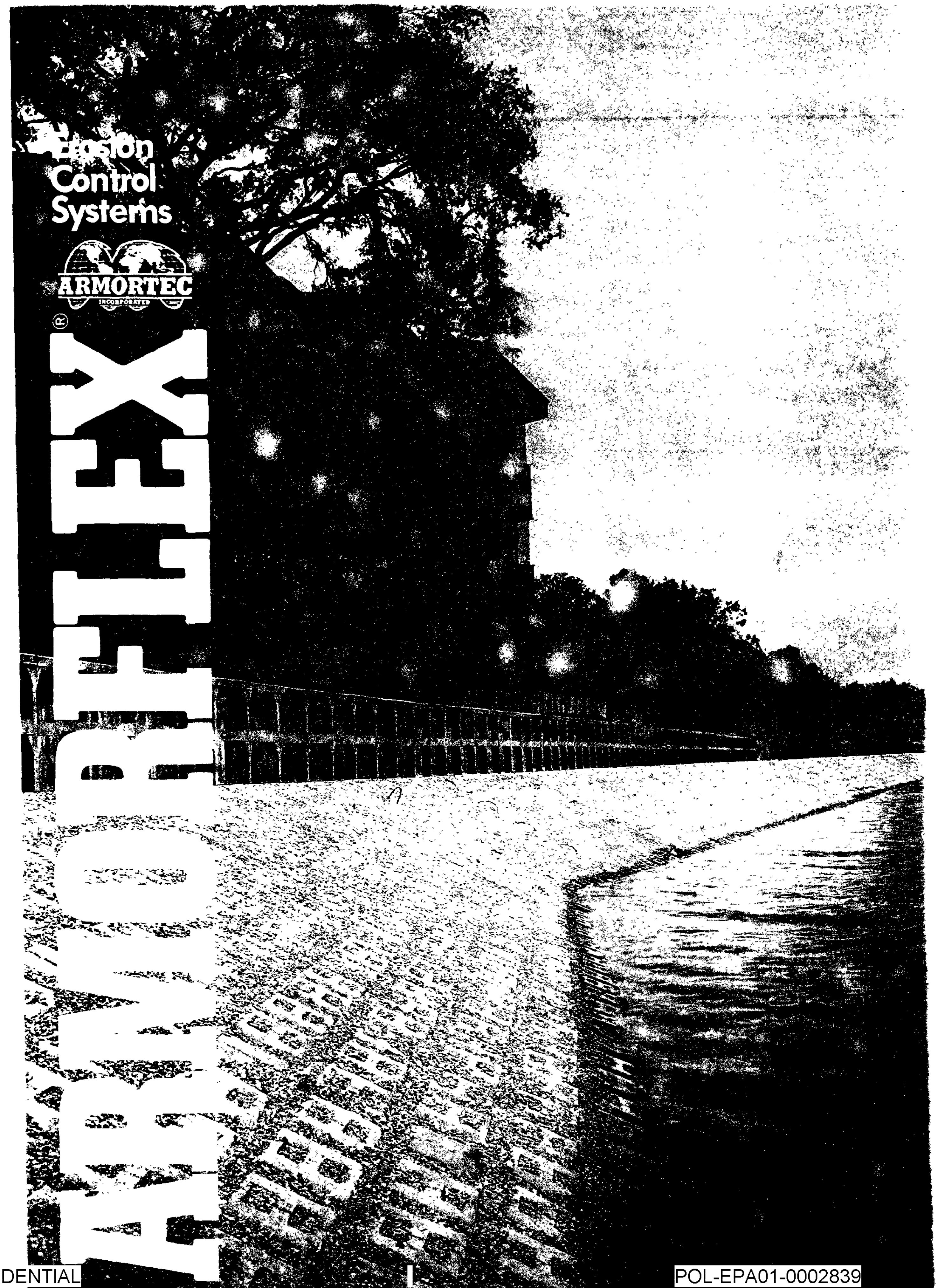
The overall effect of these design changes results in a considerable savings to the project. The affected work packages previously included sloping effort, relocating the Rio Moquino, and the placement of geofabric bedding material and riprap. The riprap package involved quarrying, processing, hauling, and placement. The previous quantity estimates roughly included 1,500,000 cy of earthwork movement, 130,000 cy of riprap, and 85,000 square yards of geofabric. The new redesign effort roughly includes 700,000 to 900,000 cy of earthwork, no large riprap, no geofabric, and less than 10,000 cy of smaller rock protection possibly combined with a man-made product.

(1) A rough comparison to the previous cost estimates indicates a cost savings ranging from **$1,200,000 to $1,500,000.**

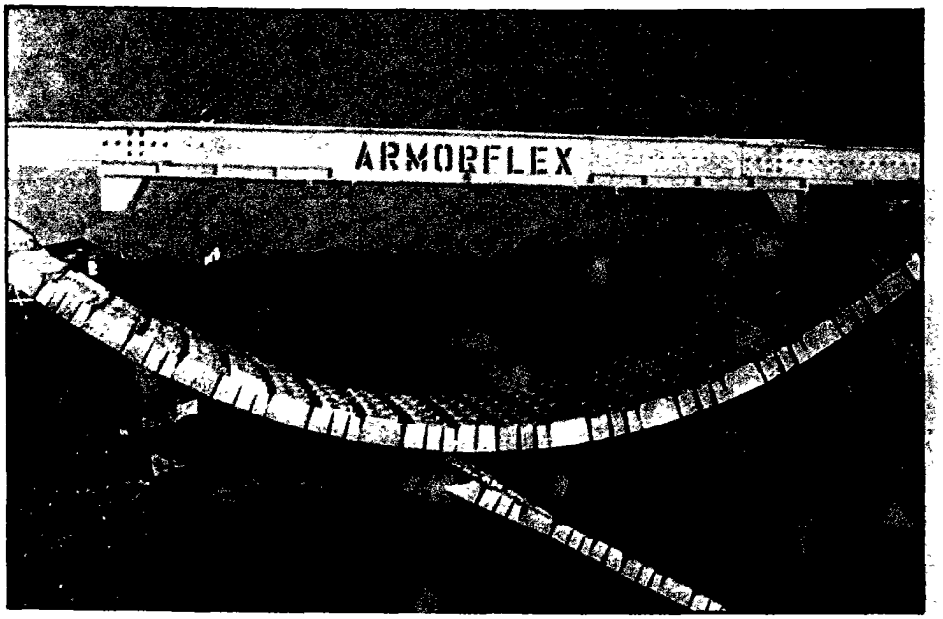
(2) The combined unit price of $12.40/cy previously used for riprap was low and a minimum of $25.00/cy should have been estimated by Jacobs. This would have resulted in an additional cost of **$1,200,000** but that risk has been eliminated by the redesign.

Combined Cost Savings: **$2.4 million to $2.7 million**

7.3 EROSION CONTROL DEVICES



PERFORMANCE TESTED/COST EFFECTIVE ARMORFLEX® EROSION CONTROL SYSTEM



Armorflex articulating precast concrete mats erosion control system.

ARMORFLEX Erosion Control System provides the engineered alternative to conventional erosion control materials for revetment and channel protection.

ARMORFLEX combines its specially designed interlocking precast concrete grids, cables and filter system to provide stable, articulated and permeable erosion protection, which maintains its integrity in the event of subgrade deformation or severe dynamic loading.

ARMORFLEX is placed by conventional construction equipment directly on the prepared subgrade of the structure as a system of factory pre-assembled mats of interlocking grids interconnected with cables.

ARMORFLEX results in a stable erosion control system available in a range of classes to accommodate various wave climates and stream flow conditions with aesthetic and ecological advantages.

ARMORFLEX, whether vegetated or otherwise, provides durable, flexible and permeable erosion protection for:

- Coastal Shorelines
- Earthen Dams
- Storm Channels & Ditches
- Bulkhead, in lieu of
- eline Crossings
- Lakes & Reservoirs
- Rivers, Streams, & Bayous
- Dikes & Levees
- Bridge Abutments
- Water Control Structures
- Ponds & Holding Basins
- Sand Dunes
- Embankments
- Spillways
- Subaqueous Pipelines
- Boat Launching Ramps

ARMORFLEX has been proven technically and economically superior to traditional protective materials. When conditions such as poor soils, limited access, aesthetic and environmental considerations or a short construction season or schedule are primary factors, ARMORFLEX has proven to be the design solution.

Characteristics.

STABILITY. ARMORFLEX provides a continuous erosion protection that acts as an articulated mattress to withstand the destructive forces of water. The proper ARMORFLEX class is determined by the design velocity or wave height to which it shall be subjected.

FLEXIBILITY. ARMORFLEX grids are interconnected by flexible cables which provide articulation between adjacent grids. The walls of the ARMORFLEX grid are designed with beveled relief to allow for flexibility in all directions.

PERMABILITY. ARMORFLEX is generally placed on filter fabric and/or conventional graded filter. The permeability of the filter system and grids relieves hydrostatic pressures while its capability for soil retention prevents leaching of subsoils through the installation.

FLOW RESISTANCE. ARMORFLEX is available with open cell grids or with closed cell grids to provide a combination of unit weight and surface roughness. The ARMORFLEX Manning Roughness Coefficient, "n", has a value ranging from 0.026 to 0.044, depending upon the grid used, material filling the cells, and vegetative cover.

VEGETATION. When vegetation is desired, ARMORFLEX's open cells are filled with soil, then sown or planted. The open cells provide a perfect environment for the establishment of vegetation. Even roots of grass and small shrubs can penetrate the filter system, providing a permanent anchor for the installation while beautifying the landscape. ARMORFLEX, with closed cells or open cells filled with stone, (d_{50} < .75"), precludes vegetative cover.

ACCESS. ARMORFLEX is free of dangerous projections thus providing safe access for pedestrians, animals, vehicles, boats, and other small craft to the water's edge.

Preparation and installation.

ARMORFLEX is delivered on trailers or barges as prefabricated mats, of up to 480 ft.^{2} per mat.

Construction begins with site preparation of the area to be protected. Vegetation and obstructions, such as roots and projecting stones are removed. Holes, soft areas and large cavities are filled and compacted with suitable materials.

- Excavate toe, terminals and upper bank protection trenches as required.
- Filter fabric and/or graded filter material, is placed over the prepared subgrade.
- The first row of mats are placed side by side on the structure by attaching the cable loops at both ends of the mat to a spreader bar for placement by a crane or backhoe.
- Adjacent mats are connected by pouring side connecting keys and/or by fastening side connecting cables and end loops.
- Optional anchors are placed at the to

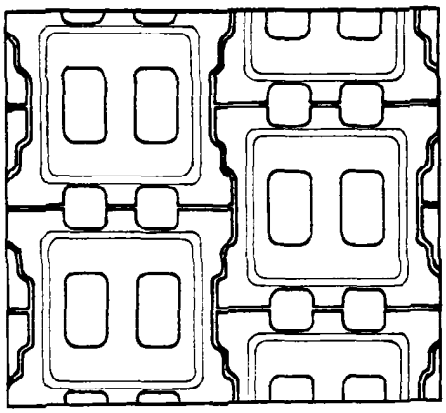
ORTEC

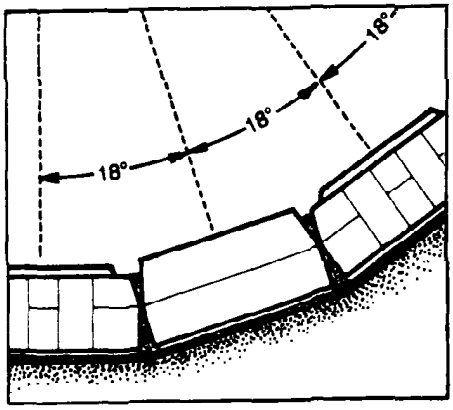
- Backfill and compact the trenches as mat placement proceeds.

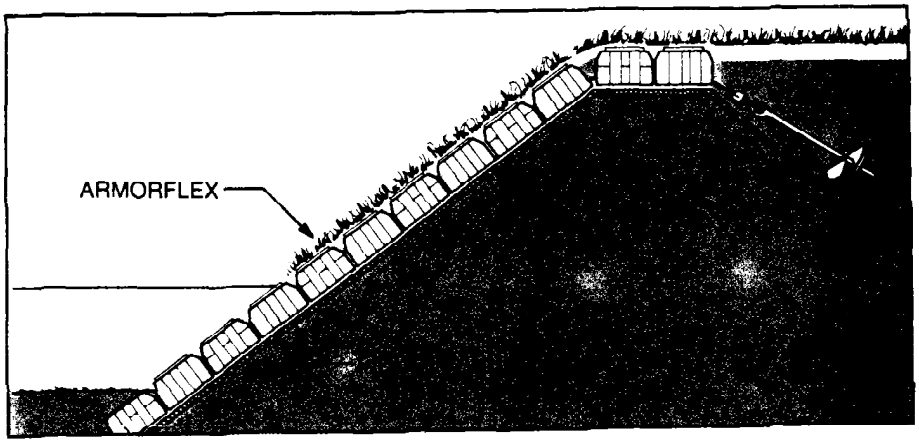
- Additional sections of mats are placed and connected until the desired limits of protection are reached.

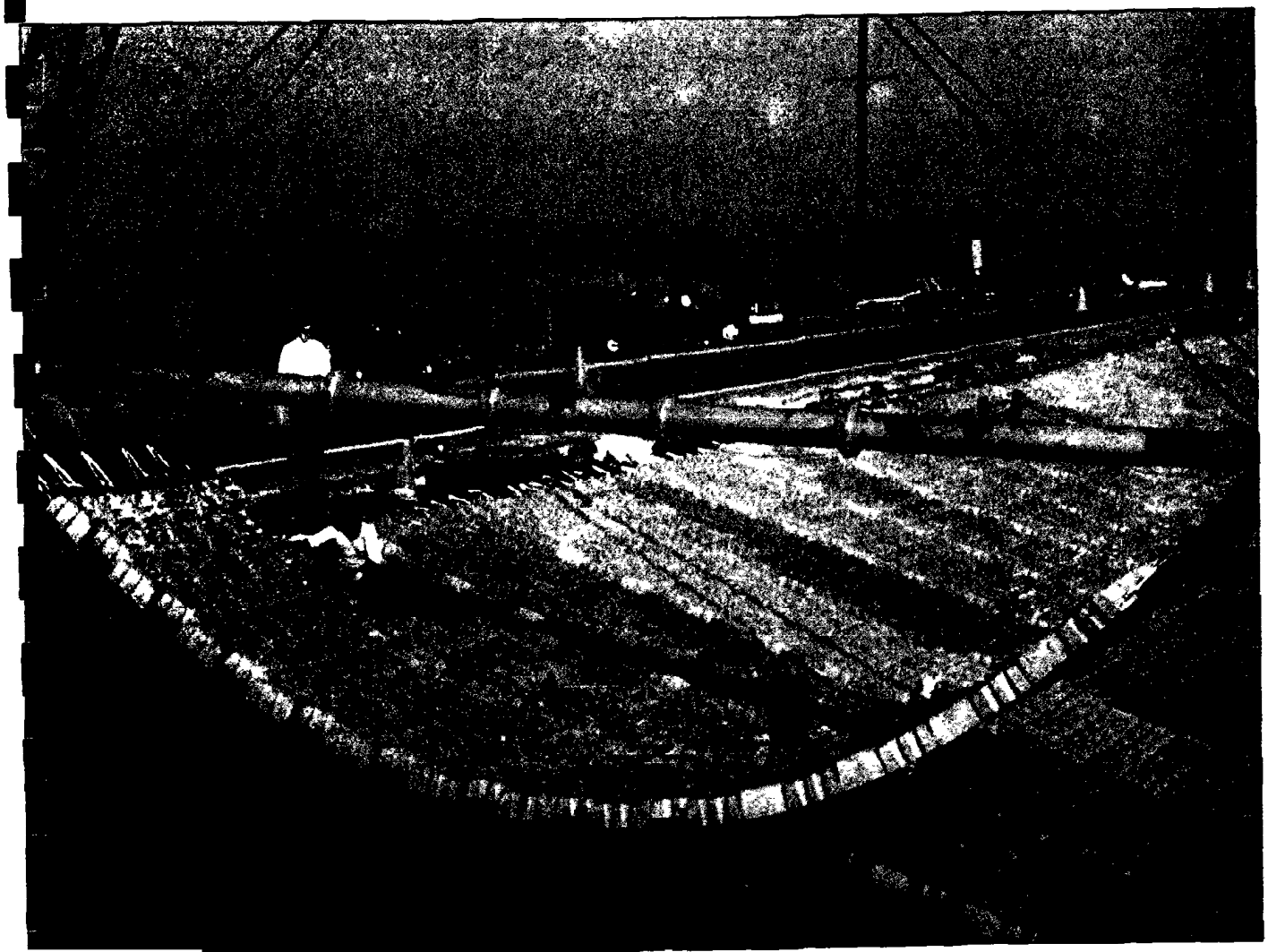
- Backfill is spread over the mats and into the open cells, then sown or planted as desired.

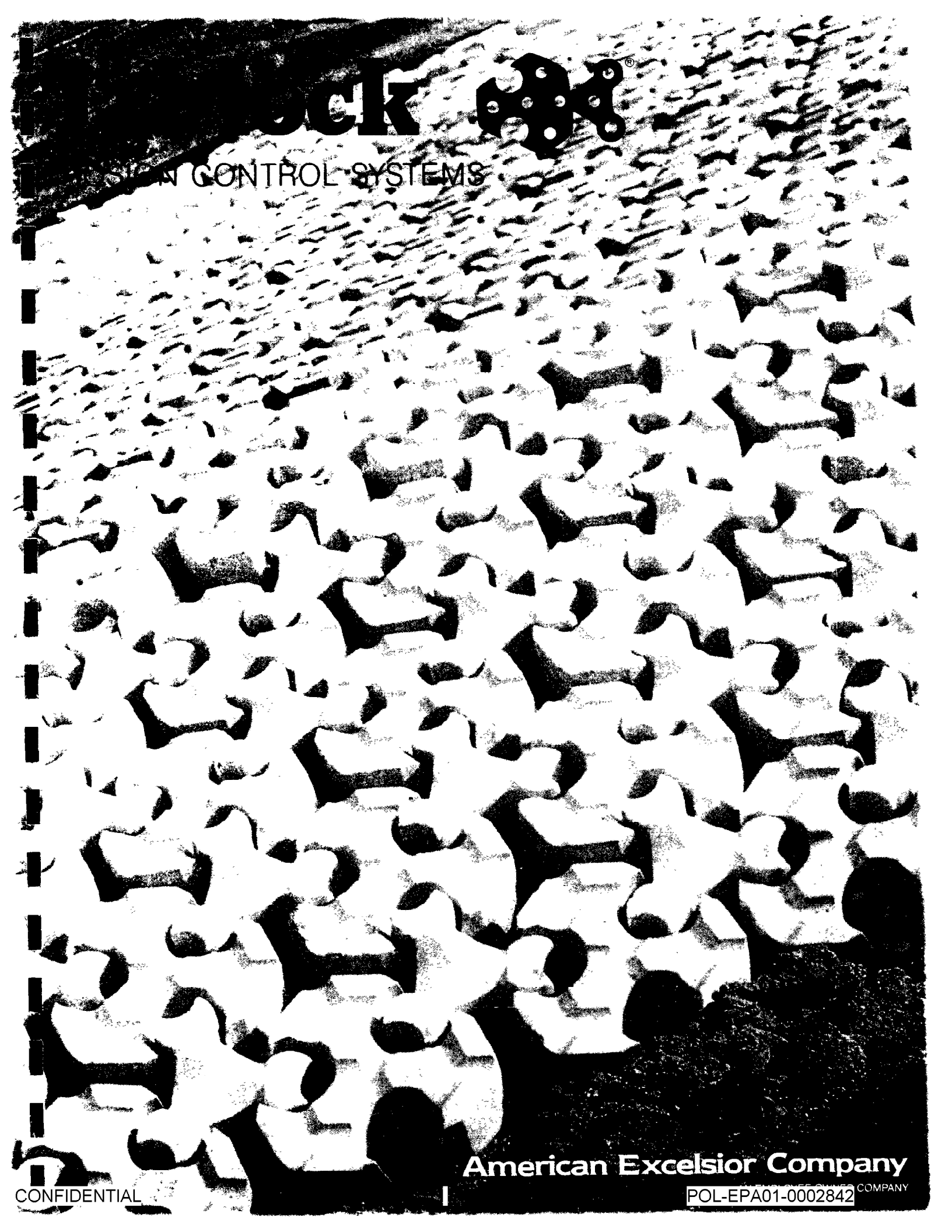
ARMORFLEX MATS CAN BE EASILY INSTALLED UNDERWATER. The spreader bar can be fitted with special, remote release clamps, which allow the mat to be released from the surface. There is no need to de-water the work area. The positioning of the mats can be done from the surface in shallow water or by divers in deep water. In addition, a structure can be easily built on a environmentally restricted site because there is no need for expensive cofferdams that disturb the natural environment surrounding the project site.











Tri-lock
EROSION CONTROL SYSTEMS®

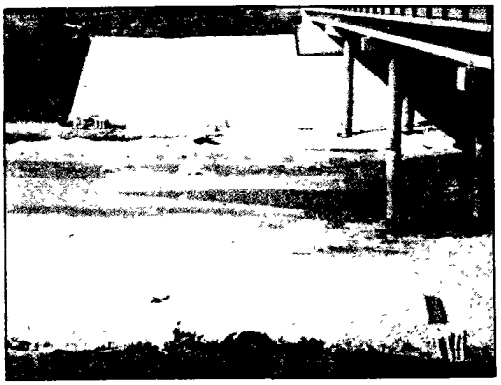
AN INTRODUCTION TO TRI-LOCK

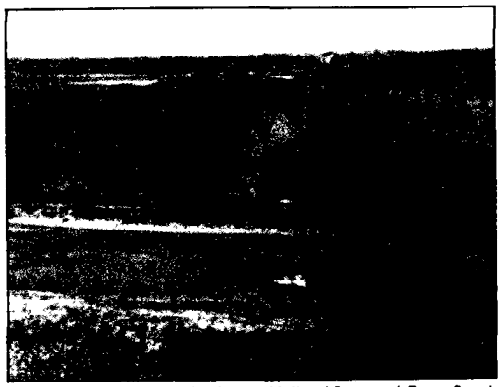
The TRI-LOCK EROSION CONTROL SYSTEM represents the most advanced and versatile system in the erosion control industry. TRI-LOCK provides the engineered alternative to conventional erosion control materials for revetment and channel protection. It continues to be an effective, economical and environmentally sound method of combating severe erosion problems.

TRI-LOCK is a flexible, permeable erosion control system that has the capacity to allow revegetation It employs a superior, specially engineered plastic filter fabric in combination with an interlocking articulated concrete block armor. TRI-LOCK is a system of pre-cast concrete blocks made up of two components: a "lock block" and a "key block." Each component is keyed into two other components giving both stability and integrity.

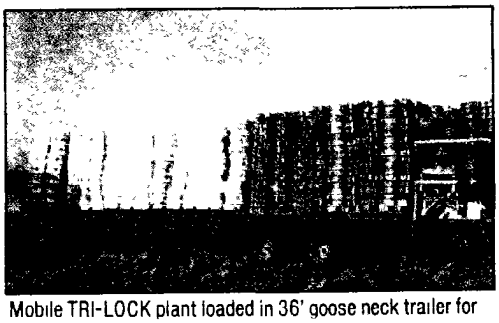
TRI-LOCK blocks are factory or field manufactured for ease of installation. They are normally installed in dry conditions by hand placing on the overlaying filter fabric. Where site conditions dictate (i e underwater applications) TRI-LOCK can be supplied on pre-assembled mats utilizing special installation techniques and conventional construction equipment In either application, the TRI-LOCK SYSTEM is easily installed with minimal manpower and equipment

The TRI-LOCK SYSTEM, a total membrane of erosion control, varies from any other system in that it is completely self-contained; there is nothing except concrete TRI-LOCK offers an additional, significant advantage over other systems through its unique shape. Its structure and shape give it the ability to negotiate changes of direction without the necessity of extra special facilities.





TRI-LOCK installation bridge at Valley View and Bear Creek.



Mobile TRI-LOCK plant loaded in 36' goose neck trailer for transporting to job site.

TRI-LOCK blocks are cured 7 days prior to transporting to job site

Site preperation prior to installation of TRI-LOCK blocks.

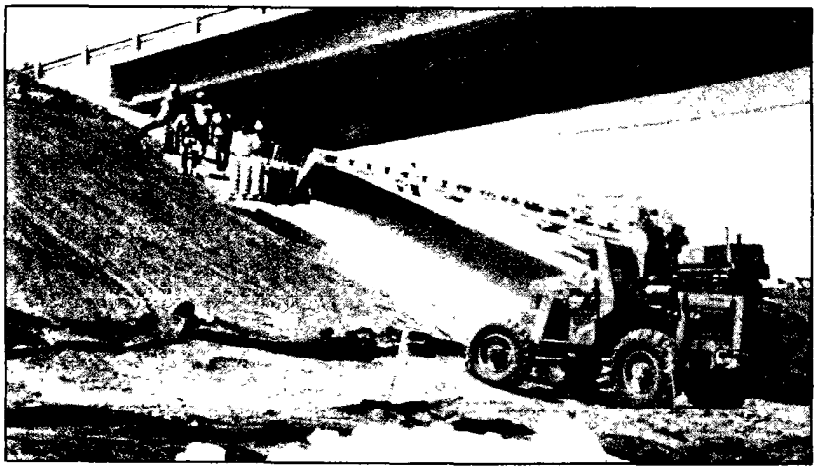
A combination of roller conveyor board slides are used to move blocks into mat assembly area.

re hand placed over TRI-LOCK fabric style 792. A 1" diameter steel pipe is employed to position blocks as needed for correct alignment.

USES FOR TRI-LOCK

- *Coastal Shoreline Protection*
- *Lake Shoreline Protection*
- *Reservoir Embankment Protection*
- *River Bank Protection*
- *Channel Lining*
- *Culvert Inlet and Outfall Protection*
- *Drainage Ditch Lining*
- *Spillway Lining*
- *Dike and Levee Protection*
- *Pipeline and Buried Cable Watercourse Crossing Protection*
- *Bridge Abutment Protection*
- *Slope Protection*
- *Boat Launching Ramps*
- *Car Park Areas*

Tri-lock
EROSION CONTROL SYSTEMS®



Use of telescoping lift is used to spot pallets.

Spreader bar and crane are used to position pre-assembled mats.

TRI-LOCK Characteristics

Stability: Highly stable, long lasting revetment. TRI-LOCK is available in a variety of sizes and weights for maximum protection with differing wave climates or flow velocities.

Flexibility: Flexibility is achieved by a bevel at the interlock of the TRI-LOCK block enabling the system to conform to changing land contours and grades.

Permeability: TRI-LOCK has adequate open area to relieve any hydrostatic pressure across the revetment. Voids are evenly and closely spaced.

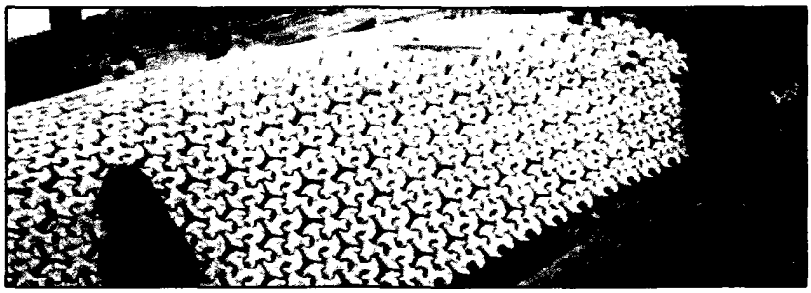
Revegetation: The voids in the TRI-LOCK system should be filled with top soil and seeded with grass or other vegetation to restore the embankment to its natural state. The TRI-LOCK SYSTEM will actually promote this regrowth process. There are no projections or abrupt uneveness, permitting easy maintenance with conventional grass cutting equipment.

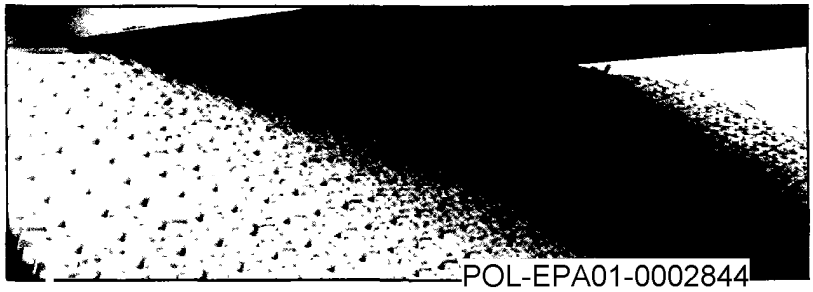
Access: The eveness of TRI-LOCK revetments provides a safe surface for both vehicle and pedestrian traffic, allowing easy access to the water's edge.

Design Features: TRI-LOCK is made from concrete, nothing else .no metal to corrode, no other fastening device subject to abrasion, just concrete, and the concrete can be made as required for the conditions to be encountered.
TRI-LOCK is a total membrane, not a set of separate mats functioning independently. Every unit in the TRI-LOCK systems is firmly locked into two adjacent units allowing the whole revetment to act as one. This feature, as well as enhancing the hydraulic characteristics, prevents major revetment failure which can result from small soil failures that often occur in extreme conditions

ADVANTAGES OF TRI-LOCK

- *Economically competitive with other types of erosion control systems*
- *Does not require cables or additional anchoring*
- *Ability to negotiate changes in direction*
- *Ability to go around structures and not effect integrity of system*
- *Sheet flow on run-off areas does not form any linear channels.*
- *Relieves hydrostatic pressure yet prevents loss of soil.*
- *Manufactured at or near jobsite*
- *Uniform installation enhances attractiveness*
- *Fully flexible and conforms to changes in subgrade*
- *Available in mat form for machine installation*





Views showing TRI-LOCK installations on berms and bridges.

Tri-lock SPECIFICATIONS:

EROSION CONTROL SYSTEMS®

TRI-LOCK BLOCKS	4010	4015	4020	8030
HEIGHT	4 in.	6 in.	8 in.	12 in.
MODULE	16 in.	16 in.	16 in.	32 in.
WEIGHT PER SQ. FT.	32 lbs.	45 lbs.	64 lbs.	90 lbs.
WEIGHT OF BLOCK PAIR (Approx.)	50 lbs.	70 lbs.	100 lbs.	560 lbs.
CONCRETE STRENGTH, 3000 psi				
OPEN AREA (Approx.) 20%				
TRI-LOCK MATS				
Available Dimensions:				
STANDARD WIDTH	4 ft.-8 in.	4 ft.-8 in.	Information	6 ft.-10 in.
STANDARD LENGTHS	16 ft.	16 ft.	available	Up to 48 ft.
	18 ft.-8 in.	18 ft.-8 in.	upon request	32 in. modules
NOTE: Special lengths made to order in large quantities.				
MAT WEIGHTS				
PER LINEAR FOOT	150 lbs.	210 lbs.	Varies	620 lbs.
16 FT. MAT	2400 lbs.	3360 lbs.		
18 FT.-8 IN. MAT	2800 lbs.	3900 lbs.		

AVAILABILITY

TRI-LOCK is well established nationwide and is made available through a portable wet casting operation or manufactured on standard concrete block machines used in concrete block manufacturing plants. Generally, TRI-LOCK is offered at or near the construction job-site on standard wooden pallets or in mat form.

GENERAL SPECIFICATIONS

TRI-LOCK flexible erosion control systems shall be comprised of three directional interlocking concrete components of the sizes shown above, overlaying a filter fabric, as specified.

The TRI-LOCK System may be hand assembled on the bank by interlocking the components in a manner that allows maximum flexibility but discourages vertical movement of any single component.

The concrete components shall be precast units having a compressive strength of not less than 4,000 psi. The oven-dry weight shall be not less than 125 lbs. per cubic foot, as per ASTM C-145, except that not more than 5% of components on any single mat shall be accepted under this minimum. Compressive testing shall be conducted on 2" cubes cut from random samples of TRI-LOCK components.

The carrier filter fabric shall be of sufficient strength to support not less than 1½ times the weight of the mat when slung by lifting at the ends. The carrier filter fabric shall consist of a suitable fabric, as separately specified, reinforced if required for the duty of the carrier as indicated above. A side flap of not less than 9" shall be provided to assure overlap of the filter panels assuring integrity of the filter blanket.

INSTALLATION

TRI-LOCK is installed by contractor's personnel using standard equipment whether the system is installed by hand placing or through the use of pre-assembled mats. A TRI-LOCK representative is generally available to advise and assist the contractor It is not necessary for the contractor's crew to have previous experience or special skills in order to economically install TRI-LOCK.

Site Preparation: Before placing the TRI-LOCK system, the slope shall be inspected to insure that it is free from obstructions such as tree roots, projecting stones or other foreign matter Voids or soft areas should be filled with suitable materials and well compacted. Although some variation in contour will be allowed, no sudden changes in level can be accepted. Hand dress where necessary.

TRI-LOCK revetment systems are normally backfilled with topsoil at the rate of 1 cu yd. of topsoil to 200 sq. ft In the event that revegetation is not provided for, then the revetment must be backfilled to an average of 1" cover on the filter fabric for the protection of the filter fabric against UV rays This backfilling should be executed within 14 days of completion of revetment. Average material required will be 1 yd. to 500 sq. ft.

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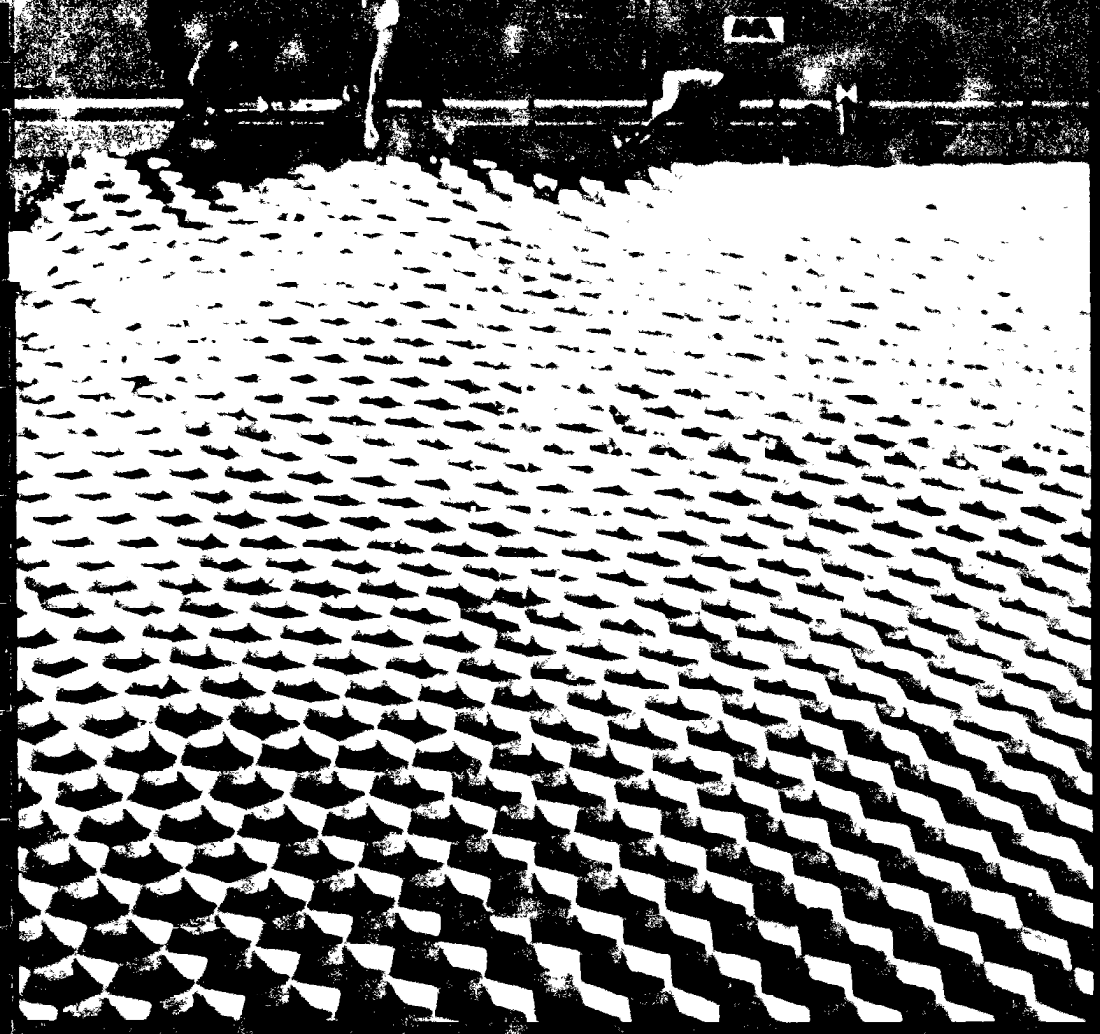
Akzo Introduces Armater Geomatrix

Lightweight Erosion Control Matrix For Heavy Duty Areas Where Vegetation Is Scarce



- Earth and slope surface reinforcements
- Highway embankments
- Headwalls and wing-walls
- Pipeline and culvert installations
- Highway bed containment
- Pond embankments
- Landfills
- Railroad ballast containment
- Earthen dams
- Tailings dams

Gaining Ground Thru Ingenuity℠

AKZO

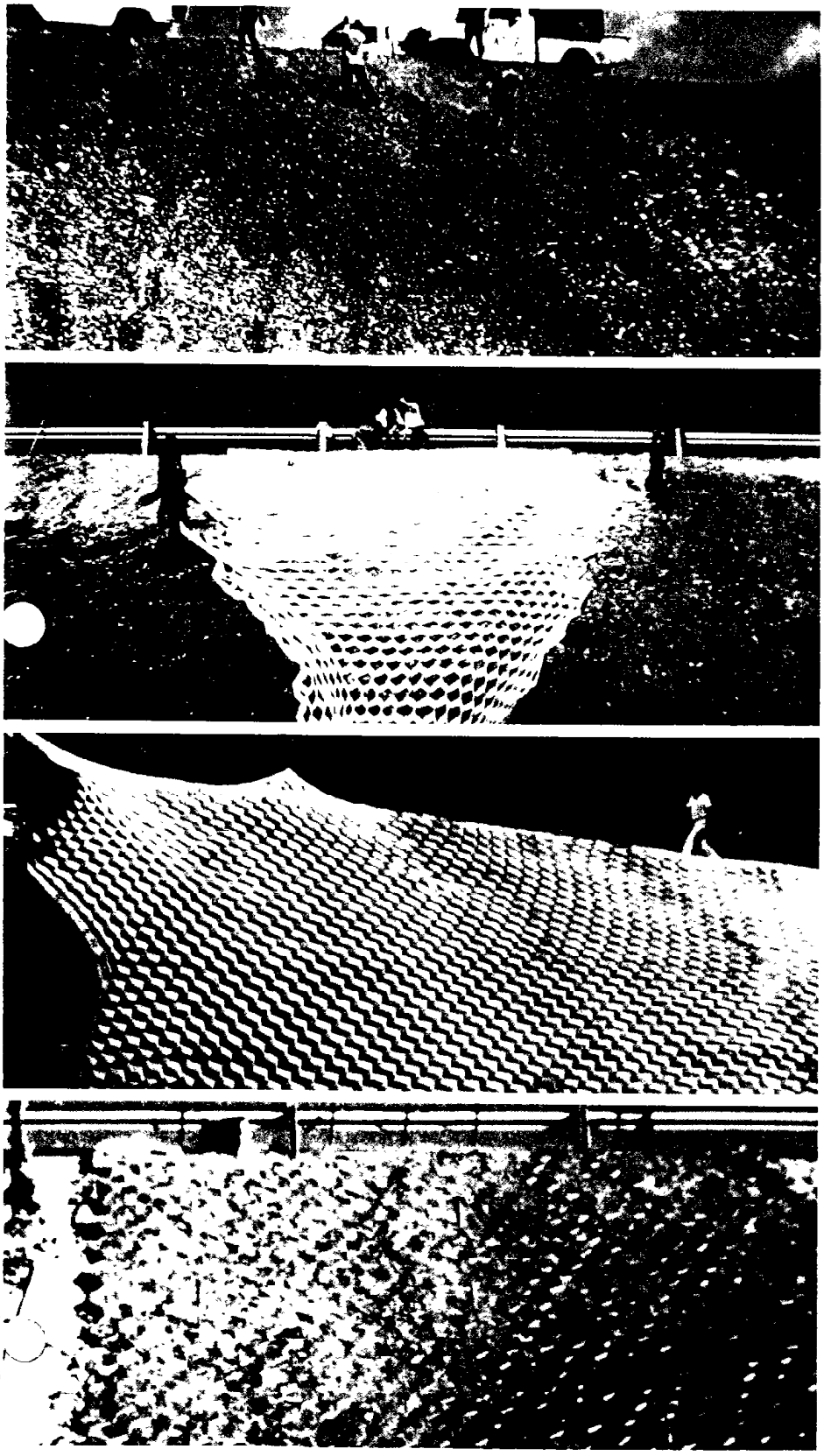
Armater™

A Lightweight, Low-Cost Answer to Stabilizing Vulnerable Surfaces.

Armater is the centerpiece of the most effective system yet developed to anchor difficult surfaces where natural OR mechanically reinforced vegetation is scarce or unavailable. Armater is the better alternative to rip-rap and concrete. It's simple to install, durable, and more economical.

Armater: A Resourceful Solution
Armater is a 3-dimensional, semi-rigid geomatrix whose honeycomb design is perfectly suited for easy deployment. It provides virtually permanent erosion control. A non-woven, polyester fabric structure, it is permeable, light in weight, rot-proof, and strong.

A Proven Tool For Erosion Control
Akzo's introduction of Armater in North America follows years of proven performance in Europe, where this lightweight fabric has already earned an international reputation for endurance, reliability, and economy. In 1983, Armater was awarded the *Prix Innovation* by the Syndicat Professionnel des Entrepreneurs de Travaux Publics (The Union of Public Works Professionals) in France.



Armater has been specially designed to provide erosion protection around the most demanding engineering and excavation projects where vegetation is scarce, such as the construction of earth and slope surface reinforcements, highway embankments, headwalls and wingwalls, pipeline and culvert installations, highway bed containment, pond embankments, landfills, railroad ballast containment, earthen dams, and tailings dams. It effectively stabilizes the surface of earth and fill structures, giving excellent slope protection By eliminating erosion, it provides landscapes that are environmentally sound and pleasing to the eye.

Stabilization Of Dry Surfaces

Armater geomatrix will hold the most difficult granular materials – such as sand, pea gravel, gravel, and aggregate – that require containment as a support material on flat surfaces to steep slopes It's most appropriate for dry or sterile areas where little vegetation can be expected.

It's well suited to steep slopes. While the maximum steepness will depend on the cohesion and stability of both the subsoil and fill materials, a slope of 1:1 can usually be effectively anchored over cohesive materials.

Because of its flexibility, it is well suited to rough terrain. Unlike more rigid materials, Armater can be easily fastened to the surface, thus conforms tightly to the ground, contouring to depressions and irregularities that invite runoff and tunneling.

Step-By-Step Installation

1. *Level the slope's surface, removing debris and filling gullies.*
2. *Spread the Armater panel across and down the slope, anchoring the edges.*
3. *Fill the honeycombs of the panel, either manually or by machine.*
4. *The resulting slope is permanently protected against erosion.*

The Armater™ Advantage

Lightweight, Low Cost, High Durability

Compared with the labor and expense of conventional masonry or rock alternatives, Armater, with its light weight and flexibility, is magically easy to handle and install.

Its reinforced hexagonal matrix provides real strength that anchors the surfaces of the steepest slopes reliably year after year. Slope surfaces remain stable and free from erosion. Under demanding slope and weathering conditions, when properly installed, it is durable, and does not crack, decay, or sag.

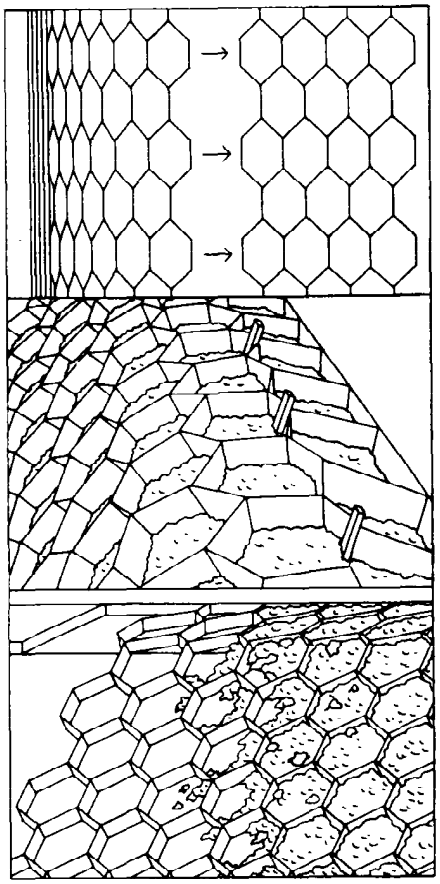
Easy To Install

For best results, the surface of the slope should be well leveled, with stones and debris removed. Gullies should be filled and well compacted.

To install, the Armater panel is spread out across a 2-to-4-foot flat ledge and down the slope. The panels need to be anchored securely on the ledge and the outer edge of the first and last panel. Panels are easily joined in series by a commercial stapler. The honeycombs of the panel are then filled with the appropriate material, beginning with the ledge at the top. Filling may be handled manually or by machine.

Series of panels can be used to cover even long slopes by placing extra anchor pins at regular intervals. The pins eliminate sideways deformation and limit downhill movement to the length of the side of a honeycomb. The extra pins can be removed after the matrix is filled.

Major obstacles such as boulders can be left in place. Simply cut around them and reinforce with a strip of the fabric. Armater is easily cut with a knife or shears.



SPECIFICATIONS

Nominal Dimensions

Expanded Panel*	39.4 feet × 32.9 feet
Collapsed Panel	52.3 feet × 5 inches
Weight/Panel	88 pounds
Coverage/Panel**	144 square yards
Cell Area	140 square inches
Cell Height	4 inches

*The 32.9 foot length should be placed parallel to crest of slope

**Maximum area is attained only when panel is fully expanded.

These specifications are subject to change.

Fabric Properties	Typical Values
Geotextile Type	Nonwoven Polyester
Weight	9 ounces/square yard
Thickness	98 mils
Grab Strength (ASTM D1682)	310 pounds (parallel to cell side)
Grab Elongation (ASTM D1682)	58%
Grab Strength of Glue Joints (ASTM D1683-597)	110 pounds
Trapezoidal Tear Strength (ASTM D1117)	120 pounds
Puncture Strength (ASTM D751)	95 pounds
Permittivity (20°C)	0.7 sec^{-1}
Transmissivity (20°C)	1.36×10^{-6} m^2/sec

For information about Armater or other fine products of Akzo Industrial Systems Company, call us at (704) 258-5050. Or write for a free information kit to Akzo Industrial Systems Company, P.O. Box 7249, Asheville, NC 28802.

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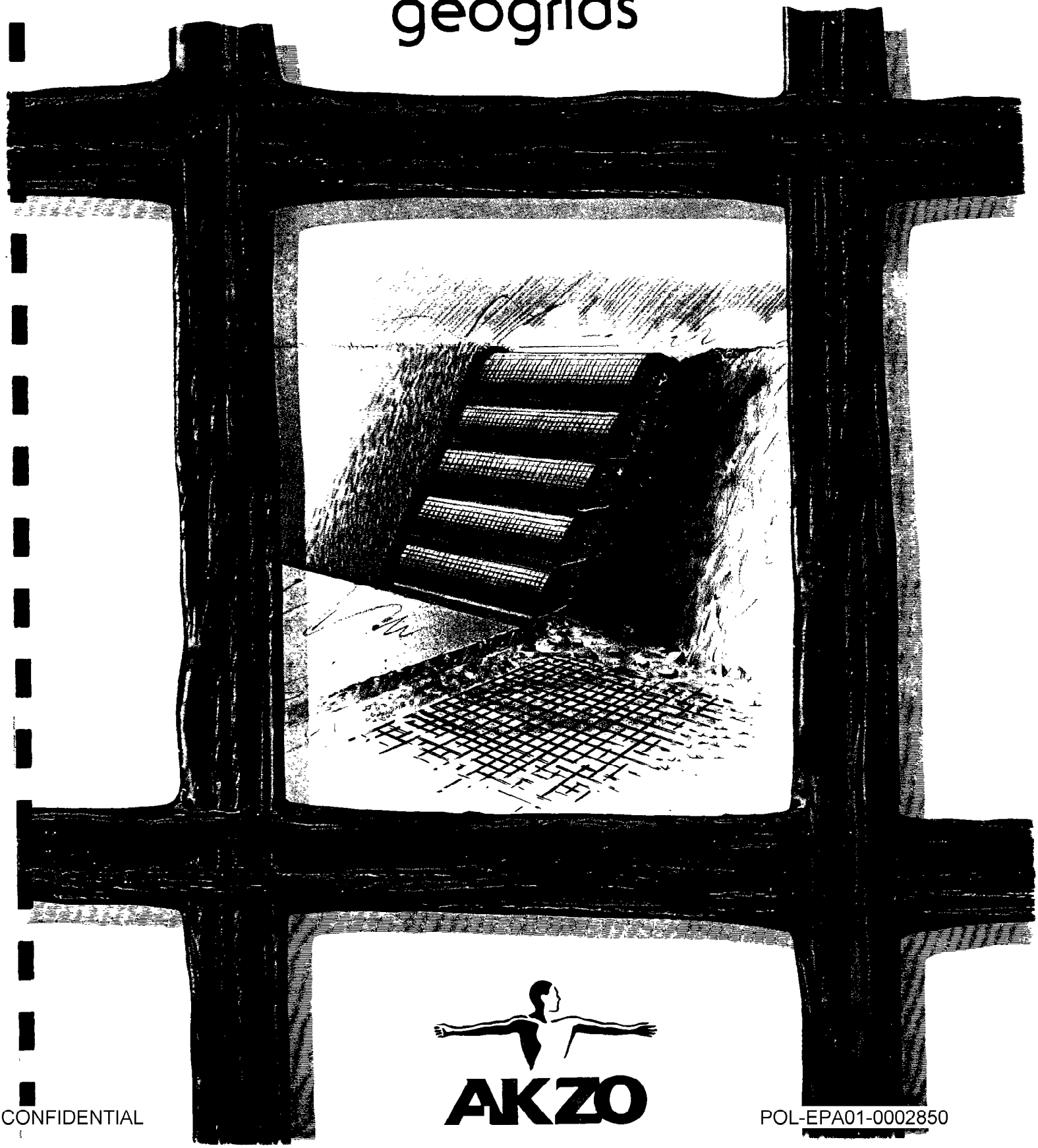
Civil Engineering &
Industrial Systems

Fortrac®
geogrids



AKZO

Fortrac geogrids

In many projects we find poor soils. For example, roads are to be constructed in areas with low bearing capacity soils or slopes have to be built with unstable fill material. In all these cases, design and construction present an engineering challenge.

Conventional design in slope construction demands either flat slopes that waste valuable land space, or extensive retaining walls. In road construction it is often necessary to improve the low bearing capacity of the subsoil by thick layers of expensive granular fill material.

Fortrac geogrids: an innovative and sophisticated product

Geogrids is the collective term for open-shaped synthetic fabrics used in geotechnical engineering. A significant advance in the use of geogrids has been made by the introduction of the innovative Fortrac geogrids. In a variety of ways, Fortrac geogrids can be used to reinforce earth fill structures, both in slope and embankment construction. The basic principle of reinforcement with geogrids is the mobilization of a high tensile force at low strain within the soil structure. This is achieved by an interlocking bond between fill and grid.

Fortrac at a glance

Fortrac geogrids are specially interwoven structures made of high modulus polyester yarns (PET), covered by an additional protective layer of PVC. They are available in various standard strengths and mesh sizes: Fortrac geogrids can also be designed and manufactured for specific problems providing an optimum solution to civil engineering problems.

Fortrac geogrids offer a technically sound and cost effective performance in a wide range of applications:

—reinforced slopes
—retaining walls
—landslide repairs
—noise barriers
—earth dams
—road, railroad and airfield foundations
—unpaved roads
—haul roads

Fortrac geogrids have proven their outstanding performance in numerous projects worldwide.

Type	Strength properties of the grid		Mesh size indication
	Tensile strength lbs/ft	Max. strain %	inch
110/30—20	7545	12.5	.8 x .8
80/30—20	5485	12.5	.8 x .8
80/30—10	5485	12.5	.4 x .4
55/30—20	3770	12.5	.8 x .8
35/20—20	2400	12.5	.8 x .8
20/13—20	1370	12.5	.8 x .8

Standard Sizes

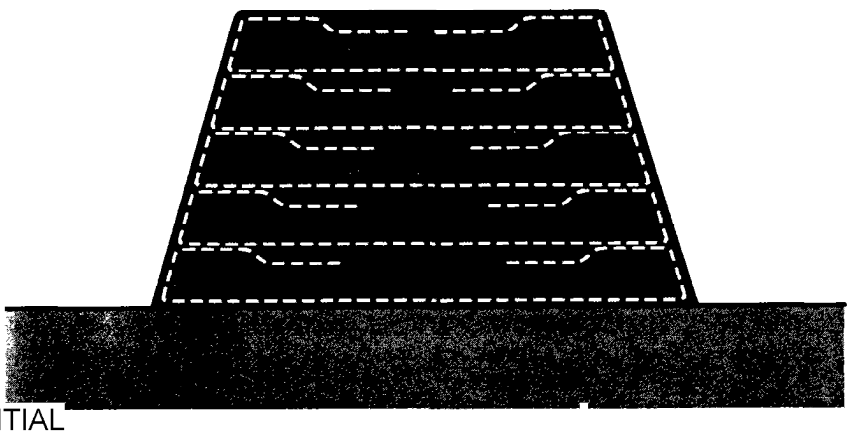
Safe slope reinforcement

In order to build steep slopes with an acceptable factor of safety the construction needs either a good quality soil or horizontal reinforcing layers to prevent a sliding failure. The use of adequate reinforcing material makes it possible to construct even high vertical walls.

In general steep slopes are impossible to construct without reinforcement. All conventional reinforcement methods, such as: concrete walls or gravity wall structures, are expensive when compared to reinforcement with Fortrac geogrids. By using Fortrac geogrids in landslide repairs it is possible to re-use the existing soil instead of incurring additional expense on better quality soils or retaining walls.

Fortrac for slope reinforcement

In a variety of situations, Fortrac geogrids can be used to stabilize slopes. The basic principle, however, remains the same: through the apertures the fill on one side of the grid is allowed to interlock with the soil or fill on the other side. This interlocking between fill and Fortrac achieves even greater strength and cohesion once compacted, providing superior anchorage. In addition, because the grid either extends across the full length of the anticipated lines of slip, or envelopes the threatened segments of fill, stresses are absorbed into the Fortrac and redistributed elsewhere in the soil block. Extensive shear box testing has shown that the resistance against sliding is increased several times over.



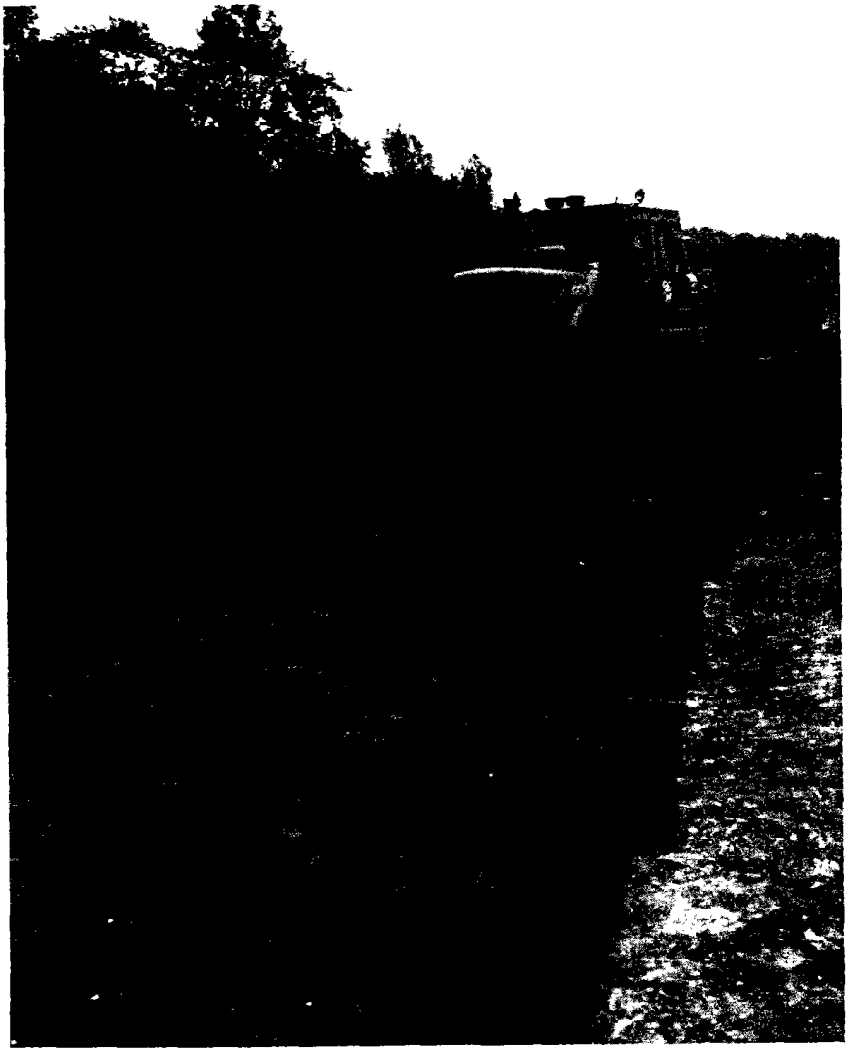
Stable embankment construction

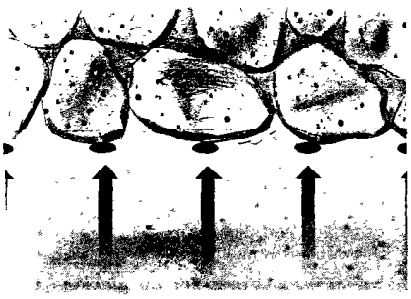
Stable embankment construction

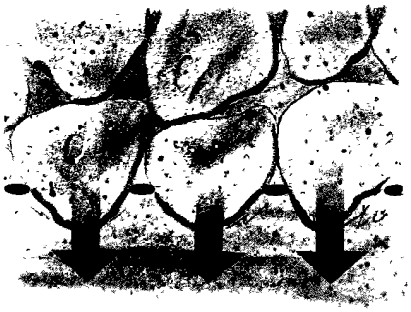
Roads consist of a base layer and a wearing surface. The total structure serves to achieve an equal distribution of loads and stresses in the subsoil. The thickness of the base layer depends on the applied loads, and the bearing capacity and frost susceptibility of the topsoil. The weaker the subsoil, the thicker the base course requirement, and consequently, both material and construction costs are increased. In addition, gravel or other appropriate fill materials normally used for the baselayer are expensive and sometimes difficult to obtain.

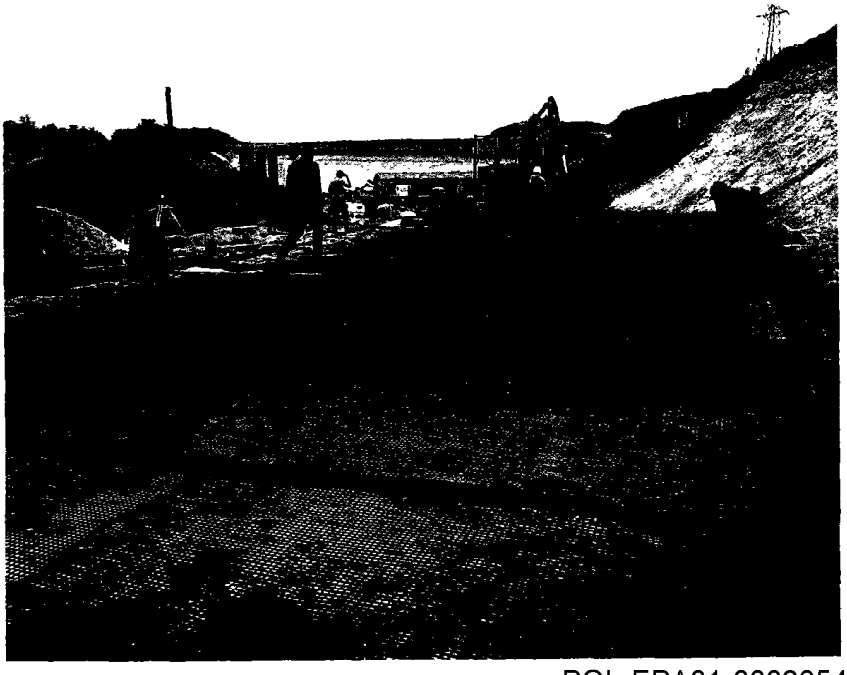
In reinforced embankments Fortrac geogrids increase the load bearing capacity of the subsoil by the absorption of horizontal stresses in the foundation subsoil and therefore decrease the differential deformations of the whole structure.

The use of Fortrac, in this way, reduces the required thickness of the base layer resulting in direct savings of material costs, and/or gives an improvement of performance and serviceability.









Fortrac geogrids: superior product with unique advantages

Fortrac geogrids are a unique combination of high modulus polyester yarns (PET) and a special manufacturing technology resulting in a superior product. Fortrac geogrids provide you with:

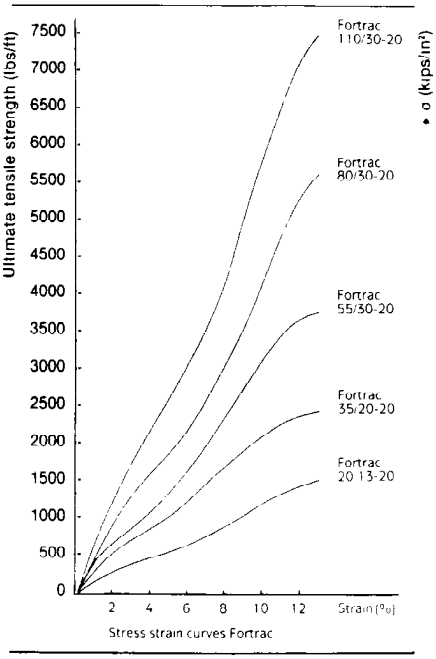
High tensile force at low strain
Fortrac geogrids are made from polyester yarns that are similar to those extensively used in car tires, seat belts and other products where faultless functioning is vital. The special manufacturing process allows their high tensile forces to be mobilized at low strains.

High specific strength
The quality of Fortrac needed to impart a certain strength is approximately half that of High Density Polyethylene (HDPE), because of the higher specific strength of polyester. Hence, less material is required to achieve the same reinforcing strength.

High design strength for long-term loading
The excellent creep resistant behavior of Fortrac can be attributed to its PET core. This explains why the allowable design strength of Fortrac is approximately twice that of HDPE under long-term loadings.

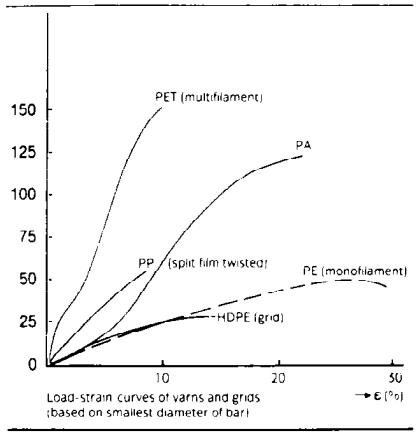
Durability
Fortrac geogrids are resistant to chemical and biological attack normally occurring in soils. Fortrac geogrids have an additional protection against UV and mechanical damage because of the applied PVC coating.

Variety of Fortrac geogrids
Fortrac geogrids are available in six standard strengths and mesh sizes to suit the wide range of applications. Moreover, special types can be designed and produced for individual solutions to specific problems.

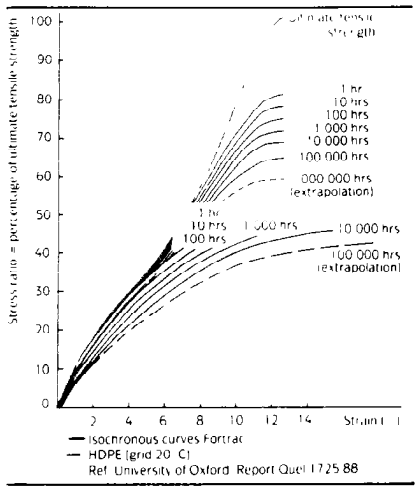


Stress strain curves Fortrac

Interlocking effect
The interlocking effect is essentially influenced by the mesh size of a geogrid, the local soil and its gradation. Two standard mesh sizes of Fortrac geogrids make it possible to find the optimum type.



Load-strain curves of yarns and grids (based on smallest diameter of bar)



— Isochronous curves Fortrac
— HDPE (grid 20 · C)
Ref. University of Oxford Report Quel 1725/88

$$P_{all} = \frac{P_c}{f_m FS}$$

P_{all} = allowable design strength

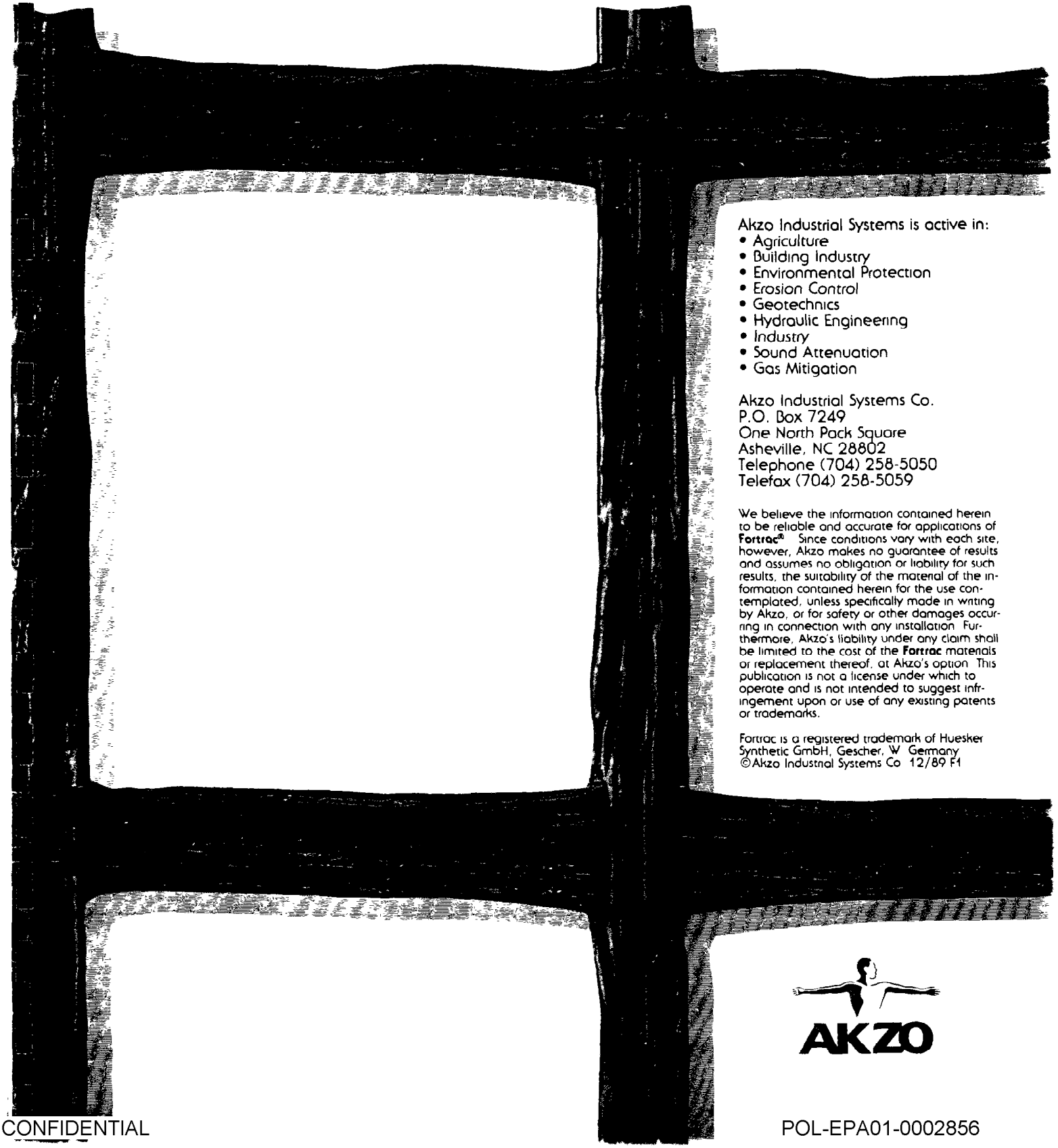
P_c = characteristic strength for a certain design period

f_m = partial factor of safety allowing for effects of mechanical damage during construction and environmental effects

FS = overall factor of safety

Fortrac	Ultimate tensile strength	Characteristic strength for 120 years life expectancy (P_c)	Actual strength under working conditions* (P_{all})
110/30—20	7545 lbs/ft	4525 lbs/ft	2793 lbs/ft
80/30—20	5485 lbs/ft	3290 lbs/ft	2031 lbs/ft
80/30—10	5485 lbs/ft	3290 lbs/ft	2031 lbs/ft
55/30—20	3770 lbs/ft	2260 lbs/ft	1395 lbs/ft
35/20—20	2400 lbs/ft	1440 lbs/ft	889 lbs/ft
20/13—20	1370 lbs/ft	820 lbs/ft	506 lbs/ft

* based on a partial factor of safety f_m = 1.20 and an overall factor of safety F[illegible] = 1.35



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AKZO

7.4 REPORT OF INVESTIGATION OF

THE P-10 DECLINE

LANDMARK RECLAMATION

DATE: July 30, 1990

TO: Jim Olsen, Reclamation Project Manager

FROM: Jim Harrison, Engineering Services Contract

RE: Report of Investigation of the P-10 Decline -- Jackpile Project.

I recommend that we design closing off the entrance to the P-10 decline by placing a bulkhead 90 feet in from the portal and backfilling to the surface rather than backfilling either 300 feet or 600 feet of the decline. This method will likely result in subsidence in the distant future; but subsidence can be a controlled accident by requiring:

- placing the road over supported ground.
- channeling the Oak Canyon drainage to the west of the old road.
- stockpiling dirt over the area that may collapse.

This will be a cost effective way of closing off the decline.

WHY IS THERE EVEN A PROBLEM IN DESIGNING A CLOSURE METHOD?

A major descrepancy was found in the design drawing of the P-10 decline -- Jacobs Engineering made an erroneous measurement of the angle of the decline:

Jacobs Engineering angle	-20.5 degrees; -37%
Actual angle	-7.5 degrees; -13%

The consequence of using a -37% decline is that the design of placing the bulkhead at 300 feet down the decline would have been an ideal location. The height of overburden at that point would have been +100 feet, an adequate depth from which future sinkhole type subsidence down the dip would not occur. However, the actual depth of overburden at that point is about 40 feet and there is a moderate probability that sinkhole subsidence will work its way to the surface.

ALTERNATE WAYS TO CLOSE OFF THE DECLINE

There are three other ways to seal the decline besides placing a bulkhead at 90 feet. Each way is dependent on the distance from the portal to the placement of the bulkhead (and backfilling to the portal) and each was given consideration; but rejected in favor of the 90 foot solution for the following reasons:

P.O. Box 193 Laguna, New Mexico 87026
(505) 242-0506

1. Place bulkhead at 600 feet -- it is unsafe to enter the decline to place a bulkhead and backfill. Remote placement is expensive. On the other hand, this is the only method that will guarantee that subsidence to the surface will not occur.

2. Place bulkhead at 300 feet -- this will not guarantee abatement of subsidence and backfilling will be expensive because the back lost during driving the decline will need to be backfilled by remote injection.

3. Place bulkhead 10 feet in from portal -- not a bad idea. The dirt that would be placed inside the portal to the 90 foot bulkhead will instead just need to placed in a mound on the surface.

CHARACTERIZATION OF THE PHYSICAL CONDITIONS IN AND AROUND THE DECLINE

A cross section is drawn of the P-10 decline and is included here as Figure 1.

ROCK -- a 20 foot thick, nearly competent sandstone (Tres Hermonos) caps the area. Its' attitude is nearly horizontal, dipping 3-degrees to the west. It is covered by only a foot or two of alluvium-like material. Underneath the sandstone is the very incompetent Mancos shale.

SURFACE DRAINAGE -- 300 feet to the west of the portal runs the Oak Creek drainage, from north to south. The reason this drainage chose this path is likely because of cracks, weakness, in the underlying sandstone. If this is the case then we can expect caving underneath this zone in the decline due to water seeping into the shale. And upon examination, this is the case. Caving starts in the decline at 300 feet and a trip underground showed that recent caving was observed after the friday 13th rain storm.

ROAD -- the present road runs west of the portal location, taking up about 100 feet of right-of-way. After reclamation, a road in this location or close by will be left.

DECLINE -- the decline was driven on a -13% grade, about 18 feet wide and 10 feet high. While going through the Tres Hermonos sandstone, rock bolts over wire mesh gave adequate support. At the 90 foot advance mark, they hit the Mancos shale in the foot wall. From this point support was provided by steel sets on 6-foot centers with 2" lagging all around.

The contractor lost the back from about 150 feet to the 300 foot mark. He caught it at the shale/sandstone contact, using short timbers and blocks for support. At about 200 feet in, the back was lost to a height of about 12 feet. It is this void, isolated from the decline by lagging over the steel sets that would need to be backfilled by injection from the surface.

From the 300 foot point to as far as I could see, about 500 or 600 feet, the weight of the shale is breaking through the lagging and leaving piles of caved material on the floor.

The decline is dry except for water running in from the surface through the portal.

SUBSIDENCE PROBABILITY

It is easier to predict whether a roof failure will propagate to surface once it has occurred than it is to predict roof failure initially. As the rock fails, it dilates (swells) relative to its intact condition. Three possible outcomes of the failure are possible, and only one results in a sinkhole:

1. the roof caves until a stable configuration is achieved, either as a result of more stable geometry than before, or as a result of a stronger material being encountered in the roof strata; or

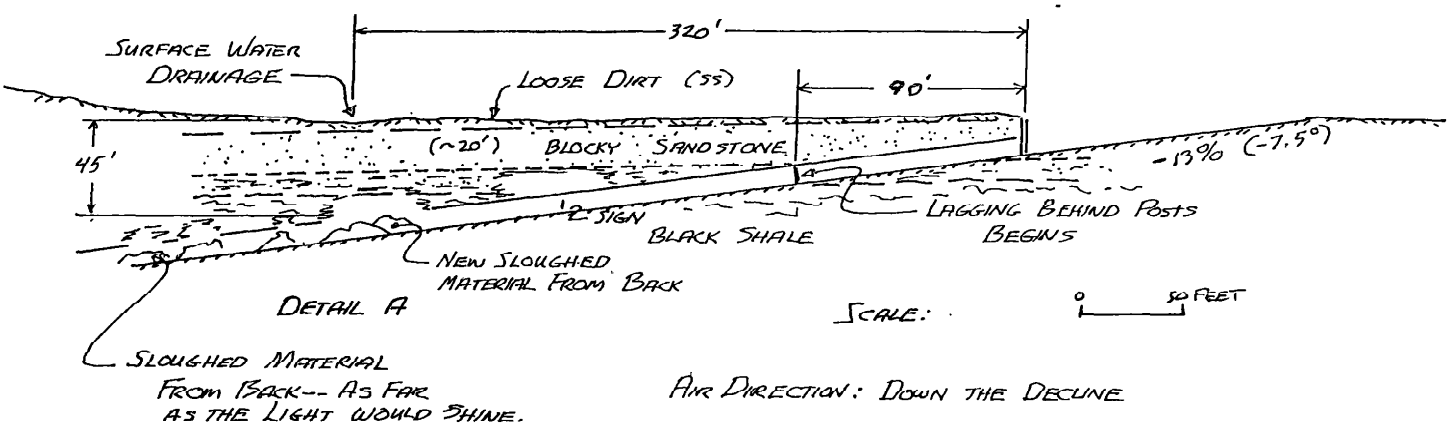
2. the material which has fallen from the roof dilates to fill the original void plus the new void created by the fall itself, in which case the roof will become self-supporting, and no further caving will occur (to put this into numerial terms, the collapse height for a conservative 30% swell, bulking factor, would result in a collapse height of 3.3 to 10 times the thickness of the decline); or

3. the roof may cave until the surface is reached, in which case a sinkhole will develop.

I would say that there is a moderate possiblility that sinkhole subsidence will occur at the 300 foot mark. The normally strong forces that come into play to prevent subsidence are flawed: the sandstone is likely cracked here and bulking will not be a factor because of the low burden height of 40 feet to mined height of 10 feet.

ACTION

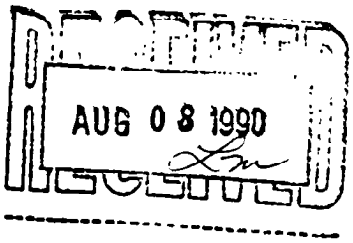
If you agree that placing a bulkhead at 90 feet (or 10 feet) makes sense then I suggest I cost out that method for the decline closure.



P-10 DECLINE
AS IS DRAWING

7.5 HEALTH AND SAFETY AUDIT OF

LAGUNA CONSTRUCTION COMPANY



MEMORANDUM

TO: J. H. OLSEN, JR.

FROM: W. J. ALMAS

DATE: JULY 31, 1990

RE: JACKPILE SAFETY PROGRAM AND INSPECTION OF LAGUNA CONSTRUCTION COMPANY

On June 13, 1990, W. J. Almas of Landmark Reclamation visited the Jackpile-Paguate Reclamation site for the purpose of reviewing adequacy of safety plans and practices. The review consisted of a meeting with Mr. Buddy Goff, Operations Superintendent, Laguna Construction Company (LCC), and a tour of the reclamation project to observe operations and safety practices. The "Jackpile Project Health and Safety Plan" (JPHS Plan) was prepared by Jacobs Engineering Group for the Pueblo of Laguna (POL) and has been adopted by the LCC and POL as the guiding safety document at the Jackpile project. The JPHS Plan is based upon applicable Occupational Safety and Health Regulations 29 CFR 1910 and 1926 regulations. Unfortunately, the JPHS Plan was drafted with a different management structure in mind than what has actually been implemented on site. The JPHS Plan envisioned a construction manager reporting to POL with responsiblity for oversight on the project and the establishment of an extensive safety staff and procedures for insuring compliance on site. The existing management structure consists of LCC operations staff responsible for safety implementation with oversight by POL for implementation of health and safety regulations. Therefore, portions of the JPHS Plan are outdated and no longer accurately describe procedures on site. The review of safety procedures indicated

LCC has implemented the major portions of the JPHS Plan which apply directly to worker health and safety. Safety procedures appeared adequate and the attitude of management appeared very conducive in fostering a safe work environment.

Specific items covered during the review and inspection are discussed below.

- Safety inspections of mobile equipment and shop work areas are carried out on a daily basis by equipment operators. Inspections are documented on an equipment inspection form kept with equipment records.

- Regularly scheduled weekly safety meetings are conducted by Mr. Buddy Goff. Various topics of safety are discussed at these meetings and specific work records relating to tasks currently in progress are reviewed. Weekly meetings are documented by a written meeting summary. Management safety meetings to discuss specific safety problems are held on a monthly basis.

- All employees and supervisors present during initial startup received 80 hours of first aid/safety training. All supervisors have first aid training.

- Emergency communication and transportation procedures have been established and are posted in case of emergency.

- Accidents are fully investigated and causes documented. Investigations are carried out by LCC and POL management and documented in written accident report.

- All observed fire prevention and protection measures were adequate. All mobile equipment is equipped with appropriately sized and charged chemical fire extinguishers.

- Access to the site is restricted to one to two locations. Access points have been adequately identified to warn the public of hazards.

- New-hire employees who were not present during initial startup have received safety orientation.

- Electrical transformers should be stored on a concrete pad with a berm adequate to contain leakage. Until tested for PCB's, transformer oil must be assumed to be contaminated and the transformer treated as such. Sampling should be made at the earliest possible opportunity.

- LCC has a random drug testing program for employees, with procedures for correction or dismissal if drug use continues.

- All highwalls in active construction areas have been bermed.

- Radiological monitoring is taking place on a regularly established basis and in general agreement with the JPHS Plan. However, several aspects of the program should be upgraded to assure health protection:

1. All new hires should receive an initial radiological health and safety orientation, including a simple test, signed by the new hire acknowledging training and basic knowledge of radiological health and safety. Periodic review of radiation safety and personal hygiene relating to radiological hazards should be covered as part of the ongoing safety training program.

2. Random frisks of workers and vehicles leaving the work site should be made for alpha contamination. Documentation on standard forms of frisks and any resulting actions should be made.

3. Careful attention to TLD badge documentation should be given. Any apparent exposures over 25% of maximum permissible concentrations on a mrem/quarter basis must be promptly investigated, documented and corrective action taken.

Summary

With a few minor exceptions, the Jackpile Reclamation Project appears to be in compliance with applicable OSHA regulations. Just as importantly, the attitude and approach of LCC and POL management is positive and conducive to fostering a safe work environment.

The Jackpile Project Health and Safety Plan is outdated and should be revised to reflect current management, safety and operating procedures while still being consistent with applicable Federal and state safety regulations. A revision is in process and will be forwarded to POL and LCC in the near future.

WJA:sav